

THE MARINE REVIEW

VOL. 38.

CLEVELAND, SEPTEMBER 17, 1908.

NEW YORK

No. 12

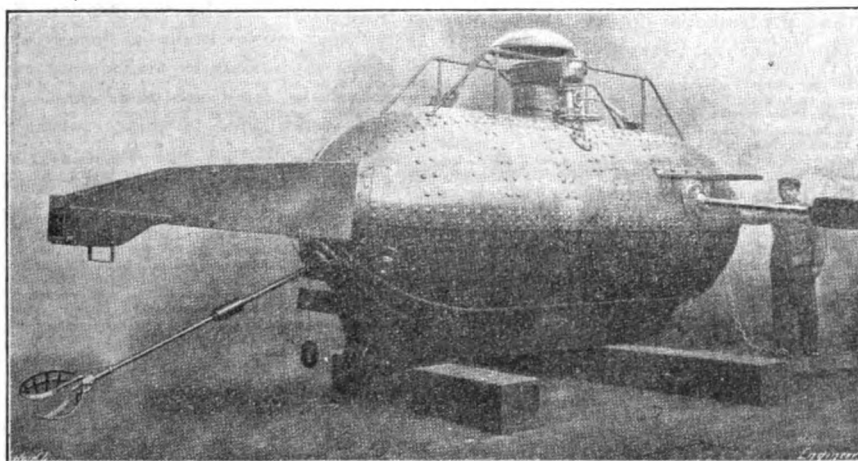
A NOVEL TYPE OF SUBMARINE.

The Societe des Forges de la Mediterranee, of La Seyne, near Toulon, has just completed for the Societe d'Etudes de Peches Sous-marines (Company for Submarine Fishing Research), of Tunis, an exceptional and curious type of submarine—not intended for any warlike purposes, but

sea; they are emptied by the aid of a hand pump placed in a suitable position. A third water ballast, holding 60 litres only, is placed in the center; it receives water direct from the sea, and can be emptied by means of compressed air from the compressed air tanks. This is used, in normal weather, for submerging and

rods having spherical joints at the point where they enter the boat, the blade consisting of a steel frame provided with two hinged floats which can only open in one direction, the result being that when moved backwards and forwards the blade offers a resistance by bearing against the water on one side, while, on the other side, the two floats turn on their hinges and allow the water to pass.

When out hunting for sponges fishing is carried out by means of a long pair of pincers, projecting from the front of the submarine and operated from the interior; the pincers can be turned in all directions and can rotate on their own axis. Just above the point where the pincers emerge there is a port hole covered with strong glass, through which the light obtained from four electric lamps of 10 candlepower each is projected so as to light up the water and the ocean bed for several square yards around. Those inside the boat can communicate with the convoy on the surface by means of a telephone and speaking tube. The submarine has just been tested in Toulon Harbor; it plunged to a depth of 50 fathoms, performed its duties without a hitch, and reached the surface unscathed in any way. The specification of this submarine, of which we give an illustration from a photograph in *The Engineer*, London, is as follows: Length, 5 m.; diameter, 1 60 m.; displacement in salt water, 8,667 kilos; floating capacity, 600 kilos; crew, two.



NOVEL TYPE OF SUBMARINE BOAT.

for use in the more peaceful pursuit of sponge fishing. It is a cylindrical machine with rounded ends, surmounted by a kiosk, which affords a means of access to the interior of the submarine, suitable devices being provided for opening or closing the entrance hermetically; this, in ordinary weather, can be operated both from the inside and the outside in case of accidents. Inside the boat it is divided into two compressed compartments—receiving air at 150 kilos. There are three water-tight compartments, two of which have a capacity of 250 litres each, and are filled by means of pipes running direct to the

raising the submarine. Underneath the vessel there is a lead weight, weighing $\frac{3}{4}$ ton, which can be released from the inside, causing the vessel to rise rapidly to the surface in case of danger. There is also a sounding plumb line, weighing 50 lbs., and operated from the inside, for producing vertical displacements, etc. On diving and reaching the bottom the submarine rolls along upon a suitable wheel placed at one of its ends, the necessary movement being obtained by the action of two submarine oars worked from the interior. These oars, the invention of Abbe Raoul, the vicar-general of Carthage, are formed of

The Manchester Liners, Ltd., have commenced the operation of a weekly service between Manchester and Montreal which will be continued until the close of navigation. The former schedule provided for fortnightly sailings only.

PROGRESS OF SHIP OWNING IN JAPAN.

(From *Engineering*, London.)

Ship owning in Japan, on a scale comparable with the shipping work of western lands, is necessarily a matter of very modern development. Whatever the country may have done or attempted to do in its earlier history, the year 1639 marked a complete cessation of foreign trade; the size of home-built ships was, about that time, limited by law in order to prevent them from venturing too far from their own shores; and among the other countries of the world, China, Korea and Holland were alone permitted to trade with Japan by sending their ships to Japanese ports. The prohibition of foreign trade thus enacted extended over a period of fully 220 years; the reopening of the country in 1853 necessitated an entire change of policy, which, keenly desired, was not so readily effected; the need, however, was emphatically declared by the Shogun's government in 1861, when permission was first given for the engagement of Japanese ships in foreign trade. This permission was so far taken advantage of that, in 1868, just after the commencement of the present era of Meiji,* there existed 46 merchant vessels, of 17,000 tons, and of "foreign" construction; some of these vessels were steamers, the others sailing vessels; some were built in Japan, and the rest purchased from abroad.

Professor Terano, in a recent note,† gives an interesting account of the beginning of the ship building industry in Japan in "foreign" style:

"A Russian war vessel, the *Diana*, lying at anchor at the port of Shimoda, and demanding a treaty with Japan, was washed ashore and sunk by tidal waves, following the great earthquake of Nov. 4, 1854. Captain Putiatin, commanding the expedition, having decided to build new ships to take his men home, selected a place on Heda Bay, in the Province of Kimisawa, in Idzu, not very far from Shimoda, and started the construction of two wooden schooners with timber grown in that district. He employed many Japanese ship carpenters to assist his crew in the building of these ships. Thus they became acquainted with the construction of

ships of the western type, and, after the conclusion of the Russian schooners, they built many of similar type in different places throughout Japan. The vessels were known for some time as the Kimisawa type, after the place where the first schooners were built. Proper methods of western ship building were thus introduced and spread over Japan."

In the early days of Meiji an intimation was repeatedly made by the government that such "foreign" vessels were allowed, and that protection would be afforded by the government to Japanese shipping enterprises with foreign countries. In 1870 the first large steamship company was established, under the name of the *Kwaisho* (the Transport Company); this company, under government auspices, underwent various changes, its name in time becoming *Nihonkoku Yubin Jokisen Kwaisha* (Japan Mail Steamship Co.). In 1871 a rival company appeared on the scene, organized by the late Baron Yataro Iwasaki, under the name of the *Mitsu Bishi Kwaisha* (Three Diamonds Co., so called from the crest and flag adopted by the new organization). This company did such excellent work for the government during the military expedition to Formosa in 1873-4 that it was deemed advisable by the authorities to lean largely upon it for support, wind up the affairs of the officially directed company, and close the keen competition that had sprung up between the two; the ships of the *Nihonkoku Yubin Jokisen Kwaisha* were, therefore, in 1876, transferred to the *Mitsu Bishi Kwaisha*, and the latter company strengthened in other ways. The combined fleet of this company then consisted of 42 ships, six of them sailing vessels, and the remainder steamers of various sizes, 12 exceeding 1,000 in gross tonnage. In 1882 the company further strengthened itself and added steamers capable of performing the functions of both transports and cruisers, a stipulation being made by the government, in return for privileges conceded, that it was to have the use of the ships, in case of need, on payment of some 5 yen per ton per month. In 1882 the gross tonnage owned by the *Mitsu Bishi Kwaisha* was 22,000. In the same year, with the object of increasing the mercantile marine, government support was afforded to a new company, the *Kyodo Unyu Kwaisha* (Union Transportation Co.), so that two companies, rivals along certain lines, were again in the field,

both obtaining assistance from the state funds. This lasted until 1885, when an amalgamation was made, and the now powerful *Nippon Yusen Kaisha* (Japan Mail Steamship Co.) formed by the combination of the two.

To the newly formed *Nippon Yusen Co.* a dividend of 8 per cent was guaranteed by the state; but this was commuted, in 1887, to an annual subsidy of 800,000 yen. In the years previous to the war with China this enterprising company made steady progress, doing most of the coastwise trade, and also the trade with the nearer foreign ports; in 1892 it established a line to Bombay, and performed, moreover, frequent services to Australia in the one direction, and to Hawaii in the other. In the Chinese war of 1894 the large steamers of the company were all requisitioned by the government, and many more were purchased by the company both for the government needs and to maintain its own trade; the services were very efficiently rendered and the company became correspondingly stronger. On the conclusion of the war, and encouraged by the new bounties, to which reference will be made in a subsequent article, the *Nippon Yusen Kaisha* resolved on a large expansion of its work and influence; it raised its capital to 22,000,000 yen, and established regular services to America, Europe and Australia, in addition to the existing line to Bombay. Large steamers, 12 of them exceeding 6,000 tons, were ordered, mostly from the Clyde, though with the reserve of a sufficient number for Japanese construction to develop and advance the art of ship building at home. Since that date the company has frequently added to its fleet, its new ships being, in recent years, all built at home—i. e., in Japan—although these have been supplemented by the ships purchased during the war with Russia and the captured ships taken over from the government after the termination of the war. Among those recently built in Japan, the *Hitachi Maru* (second of the name), 6,715 gross tons, for the European service; the *Nikko Maru*, 5,539 tons, for the Australian service; the *Tango Maru*, 7,463 tons, for the American service; and the six ships of the *Kamo* class, each of 8,770 tons, now completing, and to be employed as general traders, may be specially mentioned. Summarizing the holding of

*Meiji commenced with the restoration of the present emperor in 1867.

†American Society of Civil Engineers' International Engineering Congress, 1904.

†Kabu = share; kabushiki = limited.

this company (N. Y. K.) over a series of years we have the following data:

Date—	Vessels—		Capital. Yen*
	Number.	Gross Tons.	
1885	51	61,990	11,000,000
1890	46	66,637	10,750,000
1895	55	101,342	8,800,000
1900	67	204,713	22,000,000
1905	73	250,905	22,000,000
1908 (March)...	79	261,427	22,000,000
Building (June). 6		52,200	22,000,000

*Yen = 2s 0.582d.

In 1884 the Osaka Shosen Kabushiki Kwaisha (Osaka Mercantile Steamship Co.) was established, and received from the first some measure of government support. Many coasting services have been, and are, performed by this company, whose operations are extended also to Formosa and the coastal trade of that island, to Korea and to Hong Kong, and to various Chinese ports. The holding of the O. S. K. at various dates has been as follows:

Date—	Vessels—		Capital. Yen.
	Number.	Gross Tons.	
1885	81	15,236	1,247,735
1890	56	16,128	1,350,000
1895	55	22,535	1,940,000
1900	73	57,584	5,500,000
1905	97	92,281	9,625,000
1906	110	110,741	13,750,000
Present date ...	107	107,013	16,500,000

The reduction in number and tonnage between 1906 and the present date is explained by the fact that certain ships of this company trading up the Yangtse river in China, have been placed in the new combination mentioned below, the Nisshin Kisen K. K.

This company is on the eve of development in the direction of the establishment of a regular freight service with America, for which purpose six steamers (each of 6,000 gross tons) are at present under construction in Japanese ship yards.

The Toyo Kisen Kabushiki Kwaisha (Oriental Steamship Co.) was established in 1896. Its first three steamers were built in England, and created a Japanese service with San Francisco, making occasional runs to Mexico and other ports. At various dates the position of the company (T. K. K.) has been as under:

Date	Vessels—		Capital. Yen.
	Number.	Gross Tons.	
1898	3	18,322	2,646,440
1900	4	22,498	3,250,000
1905	4	23,894	3,250,000
1906	6	35,279	3,250,000
Present date....	8	53,065	6,500,000

The two great strides that this company is making at the present time are, on the one hand, the construction of the Tenyo Maru (now running), the Chiyo Maru, and another steamer, all of 13,500 gross tons, and furnished with Parsons turbines, to give a speed of 19 knots; and, on the other hand, the use of oil fuel, both in the large

vessels just mentioned, and in other branches of the company's work. In this connection, the company has recently purchased three tank steamers of Tyne build, and is building two more (of 9,320 gross tons each) at Nagasaki. The three turbine steamers are for the Hong Kong, Yokohama, and San Francisco run. These new developments have necessitated a much larger capital; the 3,250,000 yen mentioned above is only half the hitherto authorized amount, which has stood at 6,500,000 yen. This is now, by a recent resolution of the company, doubled, and the total capital divided into 6,500,000 yen preference shares, and 6,500,000 yen ordinary shares.

Date—	Steamers		Sailing Vessels		Steamers and Sailing Vessels	
	No.	Net tons.	No.	Net tons.	No.	Net tons.
1868	46	17,000
1875	149	42,304	44	8,834	193	51,138
1880	210	41,215	329	48,094	539	89,309
1885	461	59,613	509	52,643	970	112,256
1890	586	93,812	865	51,880	1,451	145,692
1895	827	Gross Tons	702	Gross Tons	1,529	Gross Tons
1900	1,329	543,365	3,850	320,572	5,179	863,937
1905	1,988	939,749	4,132	336,571	6,120	1,276,320
1906	2,081	1,041,311	4,497	353,434	6,578	1,394,745

The three large companies thus far referred to have a certain importance from another circumstance not yet

steamers, of 13,292 aggregate gross tons.

Mitsui Bussan Gomei Kwaisha, with 29 steamers, of 28,827 aggregate gross tons.

Ojiro Goshi Kwaisha, with 5 steamers, of 12,498 aggregate gross tons.

Tatsuura Shokwai, with 9 steamers, of 17,289 gross tons.

Ukon Gonyemon, with 7 steamers, of 16,108 gross tons.

Oaki Kikusaburo, with 14 steamers, of 22,257 gross tons.

Hiroshi Nisaburo, with 10 steamers, of 24,545 gross tons.

A summary of the total registered and unregistered ships and tonnage of the country built in "foreign" style, as held at various dates, is as follows:

Date—	Steamers		Sailing Vessels		Steamers and Sailing Vessels	
	No.	Gross Tons.	No.	Gross Tons.	No.	Gross Tons.
1890	112	26,815	81	19,853	193	46,658
1895	274	194,234	71	19,095	345	213,329
1900	510	516,292	1,108	154,663	1,618	661,955
1905	740	901,225	1,219	168,338	1,959	1,069,563
1906	799	993,302	1,255	172,279	2,054	1,165,581
1907	848	1,066,432	1,296	178,112	2,144	1,244,544

mentioned—viz., that they receive each year definite subsidies for prescribed services which they undertake. Until last year there were three other small companies doing regular services round the coasts of Japan, to, from and in China, and to and from Korea, which were the beneficiaries of similar subsidies. These companies were the Konan Kisen K. K., the Daito Kisen K. K., and the Oya Shosen Goshi Kwaisha. Last year the two former of these companies passed into a new combination, together with some vessels hitherto belonging to the Osaka Shosen K. K. and the Nippon Yusen Kwaisha.

This new company is styled the Nisshin Kisen K. K., and possesses 14 steamers in all, with an aggregate gross tonnage of 29,347 tons. The Oya Shosen K. K. has five steamers, of 8,415 tons. The other most important ship owners of the country, whether companies or individuals, are the following:

Mitsu Bishi Goshi Kwaisha, with 13

Excluding all vessels below 100 tons the figures for some years past become:

This list neglects junks; for these the approximate figures are as follows:

Date.	Number.	Gross Tons.
1895	17,360	296,000
1900	18,796	279,000
1905	20,848	251,000
1906	21,920	261,000

In this last table 1 ton is substituted for 10 koku, and all vessels below 50 koku (5 tons) are omitted. In the preceding table the increase in number and tonnage of sailing vessels from 702 in 1895 to 3,850 in 1900 will be observed; it is explained by a difference in the class of vessels included, the later figures including half casts, i. e., junks of an improved type both in construction and rig.

In a future article we propose to describe the development in the ship building trade and to deal with bounties paid in Japan.

Thomas Trahey & Son, Port Greville, Nova Scotia, launched the three-masted schooner Wellena Gertrude on Aug. 12. She is 132 ft. in length, 32 ft. beam and 11 ft. deep.

RECENT FRENCH TORPEDO BOAT DESTROYERS.

The French navy will this year be augmented by a flotilla of 21 torpedo boat destroyers. The first batch of these has recently been completed, and on their trials the vessels attained a mean maximum speed of 29½ knots, which may be considered as satisfactory having regard to their tonnage. The accompany-

that the vessels of the French navy which are called torpedo boat destroyers—or to use the French term *contre-torpilleurs*, are destroyers in name only. They are, in fact, very similar to the British "coastal destroyers," which are now-a-days called first-class torpedo boats, but are much inferior both in armament and speed to the British and German destroyers which were built at the same time. They could be regarded, continues the

Further than this, it is pointed out that the fact that the French destroyers are so different from their counterparts in other navies arises from the fact that in France there is an entirely wrong conception as to the duty which this type of vessel is called upon to perform. So far from having to contend with boats smaller than themselves, they will be opposed to vessels which are superior in every way, and it is added that the function

TABLE I.—DETAILS OF RECENT FRENCH DESTROYERS.

Nationality	France.	France.	France.
Class Type	Mousquet.	Sabretache.	Chasseur.
Displacement	302.76 tons.	328.70 tons.	447 tons.
Length at the water load line	184 ft. 8 in.	190 ft. 4 in.	210 ft. 8 in.
Breadth at the water line	19 ft. 8 in.	20 ft. 7 in.	22 ft.
Draught (astern)	9 ft. 4 in.	9 ft. 9 in.	7 ft. 9 in.
Boilers	2 Normand or Du Temple	2 Normand.	4 Normand.
Engines	2 3-expansion; 3 cylinders	2 3-expansion; 3 cylinders.	1 3-expansion 3 cylinders at the center; 2 turbines at the wings.
Propellers	2	2.	3.
I. H. P. (expected)	6,300 to 7,200 on trials.	6,800.	7,200.
Speed on trials (maximum)	28 (mean) 30.75.	29.5, 30.7.	28 knots.
Bunker capacity	27 tons.	30 tons.	—
Radius of action at 10 knots (estimated)	2,300 miles.	2,300 miles.	2,300 miles.
Radius of action at full speed	217 miles.	217 miles.	—
Armament	1 of 65 mm.	1 of 65 mm.	6 of 65 mm.
Torpedo tubes	4 of 47 mm.	4 of 47 mm.	3 of 450 mm. (18 in.).
Crew	2 of 450 mm. (18 in.). 4 officers, 56 men.	2 of 450 mm. (18 in.). 4 officers, 58 men.	— Similar protection on deck— 20 mm. nickel steel.

It is worthy of note that this latest type has as protection a deck plating of nickel steel above the boiler and engine rooms; this nickel plating is 20 mm. thick (4/5 in.).

These last destroyers are six in number. Three of them will be fitted with a central triple-expansion, three cylinders, main engine, and side twin-screw turbine engines. The turbines are of different types—one is of Parsons type, one of the Rateau type, and one of the Breguet type. The other destroyers will be fitted only with two main engines of the usual type. It is said that liquid fuel will be used on certain of them (Chasseur, Voltigeur, Tirailleur fitted with turbines).

Mortier, Fleuret, Coutelas, Stylet, Troublon, Cognec, Carquois, Trident, Pierrier, Hache, Massue, Glaive, Poignard (which have been built in the dock yards), Branglebas, Etendart, Fannion, Sape, Fanfare, Gabion, Cognec, Oriflamme belong to the Sabretache type. Those of the Spahi type include Voltigeur, Hussard, Tirailleur, Carbinier, Chasseur.

TABLE II.—DETAILS OF RECENT BRITISH AND GERMAN DESTROYERS.

Nationality	England.	Germany.
Class Type	Coastal Destroyer.*	Tartar.
Displacement	215 tons.	900 tons.
Length	166 ft. 6 in.	272 ft.
Breadth	17 ft. 6 in.	26 ft.
Draught (astern)	5.8 ft.	9 ft.
Boilers	2 Thornycroft.	4 Thornycroft.
Engines	3 Parsons turbines.	3 Parsons turbines.
Propellers	3.	3.
I. H. P.	3,750.	14,500.
Maximum speed on trials	27.52.	35.672 (mean of 6 runs).
Bunker capacity	20 tons.	74 tons oil.
Radius of action	1,200 miles at 13 knots.	1,700 miles at 13 knots.
Armament	2 12-pounders.	2 4-in. guns in some of the class.
Torpedo tubes	3 18-in.	3 18-in.
Crew	35.	68.

*The coastal destroyer is now classed in our navy as a first-class torpedo boat.

ing Table I. gives, under the heading Sabretache, the principal data concerning these boats, while under the heading Mousquet are given those of a type which immediately preceded the Sabretache class, and under the heading Chasseur details of some later vessels which are at the present time under construction. For the purpose of comparison we also give in Table II. some corresponding particulars regarding the British coastal destroyers, and the Tartar, as well as those concerning the German destroyer G 137. A comparison of the figures in these two tables is instructive, and emphasizes the contentions brought forward in the following criticisms, which are those of a Frenchman well versed in matters concerning not only the navy of his own country, but also those of other powers. He contends

critic we are quoting, as torpedo boat destroyers only in French naval maneuvers. The type of modern destroyer of the great maritime nations, against which these vessels would have to pit themselves range up to nearly 900 tons displacement, and it is certain that in an engagement the French craft would be little, if any, better than torpedo boats pure and simple.

From the foregoing it is clear, he points out, that these so-called destroyers would have no opportunity of displaying their qualities as destroyers of torpedo boats. Fighting, as they would have to, did they engage with either the British or German flotillas, they would meet with certain destruction, since they would have to deal with enemies which are individually stronger, and, taken collectively in squadrons, more numerous.

which they are capable to some extent of performing is that of protecting a squadron of larger vessels from attack—though when due consideration is made of all the factors, they are really not even powerful enough for that duty.

These strictures, coming as they do from a Frenchman, and one who is acquainted to a very considerable degree with naval matters, are undoubtedly severe, but it cannot be denied that the authority we are quoting makes out a very good case against the latest additions to the French flotilla of destroyers.

The following are among his reasons for his statements:

In the first place the speed of this type of boat is not sufficient. A mean speed of from 32 to 33 knots on service ought, he considers, to be the minimum. More-

over, the weight and the space set aside for machinery and boilers ought to be increased, so as to avoid having delicate boats, whose speed has to be reduced considerably as soon as a bit of sea is met with. At all events, oil fuel and steam turbines should be employed, as these alone will give for a minimum of weight the speed required and the necessary radius of action. The strength of the decks should also be greater than it is, so that under no circumstances can any boat be injured when making use of her armament. Even under the most favorable circumstances it is necessary, in order that a torpedo may be certain of reaching its mark, that it should be fired as near as possible to that mark, so that the causes of error arising from distance, and from the speed and direction of the vessel aimed at, may be reduced to a minimum. To this end it is necessary that the attacking boat should have its stability, speed, and facility of maneuvering most perfectly developed, and it is urged that it is impossible to have all these qualities condensed into a hull of only 328 tons displacement. At least 600 tons would be required.

With such a displacement a type of destroyer might be developed which could maintain a speed of from 32 to 33 knots on service; could carry an armament of three torpedo tubes, three 100 mm., and six 65 mm. guns. Such a vessel could render all the services required of modern vessels of this type, that is to say, it would be capable of playing either an offensive or a defensive part, and could protect the coasts or accompany fleets.

Our critic considers that the best policy which the Conseil Supérieur of the French navy could pursue is that carried out by the German authorities, for it could not hope to equal England, against which it would be necessary to bring a fleet capable of taking the offensive, whereas in recent years the French fleet has declared itself to be purely for defensive purposes.

At this point he draws attention to several anomalies which exist in the French navy. Until quite recently the chief destroyers of a group of torpedo craft were painted white, while their attendant vessels were painted black. This he ironically presumes was in order to render it more easy for an enemy to discover the presence of a flotilla which was to attack it! Lately, however, the chief vessel of a group has been painted—to use the French expression—*en toile mouillée*, a kind of kahki. It would have been much more simple, it is urged, to have all the hulls painted black or some other neutral tint.

It is also remarked what little progress has been made in the French marine in the use of oil fuel. It is not as though experiments in this direction in France were only a thing of yesterday. The first

trial of liquid fuel in that country was made, our informant believes, on the yacht Aigle, which belonged to Napoleon III. The matter was then dropped, taken up again, again dropped, and so on. "It is true," he continues, "that use is made of a combination of liquid and solid fuel, but France has not achieved the splendid results obtained in the British navy, of which the scientific spirit, the desire to excel, and the methods of research are admirable, and are the source of its perfection and of the superior work done by this fleet, which is followed in the line of progress by that of Germany. The latter country, although it has only lately started on the conquest of the world, takes a rank which is continually becoming more important, and the importance of which must go on increasing."

The *contre-torpilleur* Sabretache, has the following characteristics:

Length on the water line	58 m., say 190 ft. 2½ in.
Beam	6.28 m., say 20 ft. 7 in.
Maximum draught	2.96 m., say 9 ft. 8 in.
Corresponding displacement	328.7 tons.
Indicated H. P.	6,800.
Number of boilers	2 (Normand).
Working pressure	265 lb.
Grate area	162 sq. ft.
Heating surface	7,500 sq. ft.
Number of engines	Two. Triple-expansion, three cylinders, 19 in., 31 in., and 45 in.
Stroke of pistons	23 in.
Revolutions per minute	310.
Speed to be realized during six hours	27½ knots.
Coal consumption required per sq. metre of grate area in full power trial	400 kilos, = 37 lb. per sq. ft.

It is remarked that although this type of destroyer, or, more correctly, seagoing torpedo boat, has a slightly greater displacement than its predecessors, its quarters are less comfortable, which is certainly not an advantage, because it is impossible to expect the same work from a tired crew, which can only with difficulty obtain repose, as from a crew which can sleep in greater comfort. There are other points in the design which are far from being in the direction of progress.

The complement of this type of boat is four officers and 58 men. The bunker capacity is 30 tons of coal, which gives, according to our informant, a theoretical radius of action of 2,300 miles at 10 knots. The armament is very weak. There is one 65 mm.—2.56-in.—gun in the bows, and six 47 mm.—1.85-in.—guns on the broadside. There are two torpedo tubes—one amidships and one astern, for 450 mm.—18-in.—torpedoes of the latest type.

The Sabretache was built in the yard of MM. de la Brosse et Fouche, of Nantes, who have constructed not only the hull, but also the engines and boilers. She was launched in a practically complete state, with machinery on board. She began her builders' trials only a few days after she was launched.

NEW P. AND O. LINER MOREA.

There was launched from the Clydeholm Shipyard of Messrs. Barclay, Curle and Co., at Whiteinch, on Aug. 15, the twin-screw steamer Morea, the latest addition to the fleet of the Peninsular and Oriental Steam Navigation Co., Ltd. She is one of the new type of "M" class of steamers, three of which are being built at this time—two in the yard of Caird & Co., Greenock—and marks an advance on the other vessels of the class in power, size and accommodation. Speed being a regulating object in the design of the vessel, her fine lines and graceful appearance suggest a large yacht rather than a vessel of commerce. The chief dimensions of the Morea are: Length, 560 ft., breadth, 61 ft. 6 in.; depth, 39 ft.; and gross tonnage, 11,500 tons. The vessel has been built under the supervision of the P. and O. company's own staff of inspectors, to the

requirements of the board of trade for a foreign-going passenger steamship, and under the special survey of Lloyds Registry. The hull has been constructed of Siemens-Martin mild steel, and is divided into separate water-tight compartments with a complete inner bottom fitted all fore and aft, and numerous water-tight bulkheads dividing the hull transversely. The vessel has four complete decks, viz., orlop, lower, main, and upper—sheathed with teak and yellow pine. Above the spar deck is a long forecabin, a midship hurricane deck, and poop deck aft. Above the hurricane deck is the first-class promenade deck, extending for 300 ft. amidships. The second-class promenade deck, 130 ft. long, is situated above the poop deck. Above the mid-ship promenade deck is the boat deck, at the fore end of which are placed the captain's and officers' rooms, surmounted by wheelhouse and two flying bridges.

The arrangements for the passenger accommodation have been designed to give the maximum of space and comfort to each individual. The first-class passengers, 400 in number, are all berthed amidships; the sleeping cabins being placed on the main, spar and hurricane, and promenade decks. The dining saloon is situated on the spar deck at the fore end of the bridge space, and extends the

full breadth of the ship. A feature of this apartment is its great height, with a large open well overhead, which extends through three decks to a large dome of stained glass on the boat deck. A handsome double stairway at the aft end of the dining saloon leads to the hurricane deck entrance hall, aft and forward of which are placed the divan and music rooms. At the aft end of the promenade deck is the first-class smoke room, a spacious and well-appointed room with a large lighting well overhead. The second-class passengers, 200 in number, are accommodated towards the after end of the vessel, and everything is arranged for them in a style but little inferior to the first-class. Large storerooms are provided on the orlop deck, and a refrigerating chamber with separate compartments for preserving perishable provisions, also an ice-making room, the temperature of these chambers being kept at any desired point by a refrigerating machine on the dry-air principle, placed in the engine-room. In addition to this, a large refrigerating installation is fitted for carrying meat cargoes in the forward holds, which are insulated for the purpose. The electric light plant consists of five independent dynamos, each driven by compound coupled engines, and in addition a dynamo is fitted complete and self-contained for use in emergency. On the upper deck, at the aft end, is situated a large post office, fitted with sorting tables and other devices necessary for the expeditious handling of mails, whilst on the main deck is a supplementary sorting-room so that a more than ordinary heavy mail may be dealt with. The mail-rooms for India, China, and Australian mails are arranged on the lower deck. Bullion rooms are situated on the lower deck; they are built of steel and fitted with Chubb's doors.

The ventilation of the vessel is unusually complete, and in addition to the usual methods electric fans are fitted throughout. The Lascar crew are berthed at the extreme aft end, under the poop, while the British crew and stewards are accommodated at the fore end of the main and spar decks. The engineers are on the spar deck; alongside the entrance to the engine-room. A novel feature is a large steam laundry on the poop deck, fitted up with machinery of the latest type.

The steam steering gear is in a steel house immediately over the rudder head. It is actuated by a telemotor gear from the bridge and aft, and hand steering gear is fitted for use in the event of a breakdown in the steam gear. The cargo loading and discharging facilities are very complete. Eight cargo hatchways are served by 10 powerful hydraulic cranes, and the absence of noise in working these will be appreciated by passengers. Hy-

draulic boat hoists are also supplied.

The machinery for propulsion consists of two sets of four-crank quadruple-expansion engines, balanced for smooth and silent working, which will reduce vibration to a minimum. It is designed to develop sufficient power to give a speed of 18 knots. There are eight boilers, working at a pressure of 215 lbs. per square inch, four of which are double-ended and four single-ended. Collectively, there are 36 furnaces. They work under Howden's forced draught system, and have four large fans electrically driven. The outfit of auxiliary machinery in engine-room is unusually comprehensive, and includes 14 separate steam pumps, an ash expeller, a feed water evaporator, a feed water distiller. Evaporating and filtering plant is fitted both in the engine-room and for the refrigerating machinery. A special feature is the ash expeller, whereby the ashes are put out through the ship's bottom. The keel of the vessel was laid on Nov. 6, 1907, and, being launched on Aug. 15, gives a period of nine months and one week occupied in construction. It is expected that she will be handed over to the owners, ready for service, about the end of October, or in less than one year from the laying of the keel. The naming ceremony was performed by Mrs. Russell Ferguson, wife of the managing director of the builders' firm, and the owners were represented by J. H. Taylor, Mr. Leslie, Mr. Lowe, Mr. Wilson, and other members of the staff of the company.

SEAFORD MARINE RAILWAY & SHIP BUILDING CO.

The Seaford Marine Railway & Ship Building Co. recently organized at Seaford, Del., capitalized at \$100,000, has elected the following officers: L. B. Cannon, a prominent business man of Seaford, who is also interested in the lumber country of the south, president; Dr. W. F. Haines, an eminent physician of Delaware, first vice president; H. C. Darbee, a prominent merchant of Seaford, second vice president; J. Emory Willey, Jr., a young and active merchant of Seaford, secretary and treasurer, and M. P. McDonagh, who has been in active marine service for a number of years, is a Baltimorean, having served his apprenticeship with the ship building firm of Stevens & Newman, Baltimore, Md., designer, general manager and superintendent.

The board of directors are: President, L. B. Cannon, Dr. W. F. Haines, H. C. Darbee, Col. E. C. Ross, J. E. Willey, L. W. Hurley, E. J. Winder, Geo. M. Eddy and J. J. Perry, all res-

idents of Seaford and men of the highest business integrity.

The marine railway will be 800 tons capacity of the Crandall type (railway dry dock) and is now being installed by H. I. Crandall & Son Co., of East Boston. The plant will be entirely modern, being equipped with the latest improved wood working machinery, and air compressors.

General Manager M. P. McDonagh has completed the plans. Material has been ordered for the buildings. The main building will be 130 ft. by 44 ft. and seven stories and will be covered with corrugated roofing galvanized iron. The upper or second story will be used as a mold, sail and riggers' loft. The lower part will contain the offices and store room and shipwrights' department. Adjoining this building will be the mill and joiner shop, forming an L. The lower part of this building will be taken up by machinery, bevel band saw, jointer, main engine, air compressor, surface planer and matcher and many other useful machines. At the main dock will be erected an 80-ft. shears of Oregon pine. A spur track will be put in from the main line of the Pennsylvania railroad to the shear and store rooms. The building slips are being put in and the piling for the ways are about 50 per cent driven.

THE JAPANESE NAVY.

According to the *Moniteur de la Flotte*, the funds set apart for the Japanese navy for the year 1908-1909 amount to \$42,498,150, to be distributed as follows:

Admiralty board	\$ 1,381,120
Officers and men	9,194,850
Naval instruction	835,295
Yards and ammunition factories....	6,325,945
Hydrographical survey	142,550
Briquette works and coal mines....	153,400
Hospitals	275,640
Law courts	67,110
Aides de camp, special service, etc..	25,660
Commission of accounts.....	14,980
Various	788,650
Hydraulic works	3,229,100
Naval construction	13,900,600
Armament	6,146,600
History of the war.....	16,650

The sum for new ships amounts to \$10,710,570, and that for their armament to \$4,871,000. The new ships are to be provided with boilers fitted for liquid fuel firing.

The Pacific fleet, with the torpedo boat destroyers in tow, arrived at Honolulu Sept. 2. The towing of the destroyers by the cruisers has proven more or less of a success in the cases of the Preble and Perry, which did not part their lines during the voyage; the Whipple was once obliged to slacken speed because of a chafing line, while the lines of the four remaining tows parted once or twice in each instance.

SHIP BUILDING ON PACIFIC COAST.

Office of the MARINE REVIEW,
302 Pioneer Bldg., Seattle, Wash., Sept. 10.
Plans are being drawn at the office of Sloan Brothers, ship builders, Seattle, for a big daylight excursion steamer with a capacity of 3,100 passengers to accommodate the visitors at the Alaska-Yukon-Pacific exposition which will be held at Seattle next summer. The steamer will be screw driven and elaborately furnished. The plans are not yet finished and it will be six weeks before more definite information regarding the new steamer will be available.

Sloan Brothers recently laid the keel of the Vashonian, a passenger steamer being constructed for the Vashon Steamboat Co., which will operate a line between Seattle and Tacoma via Vashon Island. The Vashonian will be 125 ft. keel, 22 ft. beam and 11 ft. deep. She will have triple-expansion 600-H. P. engines which are designed to drive her 18 miles an hour. She is designed to carry 300 passengers and will cost \$35,000. It is expected that the Vashonian will be finished the latter part of November.

The British steamer Beechley, 3,811 gross tons, which was badly damaged by striking an uncharted reef off Sledge Island, Alaska, last June and has since been lying up at Quartermaster Harbor, has been surveyed and bids for her repair have been submitted by various local ship building firms. Thirty plates will have to be faired and 20 new plates put on the Beechley's bottom. It is also understood that the steamer's frames and beams are more or less bent. The job involves an expenditure of \$35,000. The successful bidder will be announced in the near future.

Running in a dense fog Sunday morning (Sept. 6) the steamer Utopia, of Seattle collided with the Whatcom, also of Seattle, while off Marrowstone Point, near Port Townsend. The Whatcom was scarcely scratched but the Utopia lost a piece out of her guard and underwent other minor injuries. She has been taken off her run to be repaired.

The two latest Pacific coast steamers to be equipped with wireless telegraph apparatus are the Santa Clara, owned by the Pacific Coast Steamship Co. and running between Seattle and Valdez, Alaska, and the Sarah, operating on the Yukon river between St. Michael and Dawson City. With its installation on the Santa Clara, practically all of the regular boats of the Pacific Coast Steamship Co. are now

equipped with wireless. The Sarah is the first boat on the Yukon to be so outfitted. Next season it is expected a number of other Yukon steamers will be provided with wireless apparatus as there are now four land stations in the Yukon district with which the steamers may communicate.

A spirited revival in the Oriental flour trade and a record catch of sockeye salmon in Puget Sound and Alaska waters at present the two most encouraging features of the shipping situation on the Pacific coast.

After a long period of inactivity the mills at Walla Walla, Wash., and other inland points, which make a specialty of grinding for the Oriental trade have resumed operations and are working daily, including Sundays. The informal embargo which the Chinese have long maintained against American flour seems to be raised. On Sunday last 2,000 bbls. of flour were loaded on cars at Walla Walla and consigned to the Orient. This flour goes by rail to Tacoma and Seattle where it is transferred to sail and steam vessels for the east. As a result of this renewed activity the docks on Puget Sound and the Columbia river will be busier than for some time past and eastern charters will be firmer.

The catch of sockeye salmon in Puget Sound and Alaska waters, which has a large influence on coastwise shipping and the minor marine interests of the Pacific northwest, is breaking records this year. The Bellingham companies alone report a catch of 75,000 in a single day. It is expected that the 1906 pack of 3,817,316 cases of canned salmon will be materially bettered this year. The salmon packing industry keeps busy an extensive fleet of tugs, trap boats and cargo craft, all necessary in handling the catch.

Commencing Sept. 21, Portland, Ore., will have regular 30-day steamship freight service with New York and other Atlantic ports by way of the Tehauntepec railroad in southern Mexico. Two steamers of the American-Hawaiian Steamship Co. will take care of the service and on the southbound trips will run via Seattle and San Francisco, giving direct connection with the company's steamers plying between Puget Sound and the Hawaiian islands.

With a cargo of black powder for the Du Pont de Nemours Powder Co., the American barkentine Good News recently arrived in Tacoma after an eventful and stormy passage of 209

days from Wilmington, Del. The ship met severe weather off Cape Horn, where she struggled 40 days to get into the Pacific. On May 26, when off Valparaiso, a sudden squall carried away all the yards and nearly all the sails, forcing the crew to complete the voyage with a jury rig. Capt. Peter Erickson and 12 men comprised the crew. The vessel was long over due and was quoted at 50 per cent.

At 9:50 A. M. Aug. 15 the United States cruiser Colorado ran aground near Double Point, Puget Sound, 25 miles north of Seattle. A dense fog was the cause of the accident. She was but slightly damaged and floated with the high tide at 4:50 P. M. She has been ordered back to the Bremerton navy yard for repairs.

Three lightships, Relief and Nos. 88 and 72, will leave Tompkinsville, Staten Island, Sept. 1. for the long voyage through the Straits of Magellan to Seattle, Wash. The fleet will make eight stops and it is expected the trip will occupy 135 days. After being overhauled upon arrival the ships will be assigned to Pacific stations.

Capt. A. S. Lanneau is building a new steamer for all year traffic on the Pend d'Oreille river between Metairie and Newport, Wash. The new boat is now ready for her machinery and will be under steam early in September. She is built unusually heavy, so as to successfully break through the ice that obstructs the river in midwinter.

The cargo of the Pacific mail liner China, which left San Francisco Aug. 18 included 470 submarine mines, which will be unloaded at Cavite, P. I., and planted at various points in the Philippine archipelago.

CANADA RULES OUT STEAM TRAWLERS.

An order in council passed by the government of the Dominion of Canada prohibits fishing by means of steam trawlers within the bays and harbors of the Dominion, or within the three-mile limit. The order is a result of recent attempts to introduce this means of taking fish by trawlers from Scotland and the North Sea, where this method is in common use. The government took prompt action to prevent the extermination or serious diminution of the fish supply.

The steamer Hoover and Mason which grounded in the St. Clair river will go into dry dock at Lorain for repairs.



DEVOTED TO EVERYTHING AND EVERY
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CIATED WITH MARINE MATTERS
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Published every Thursday by

The Penton Publishing Co.
CLEVELAND.

BOSTON.....73-74 Journal Bldg.
BUFFALO.....932 Ellicott Sq.
CHICAGO.....1328 Monadnock Bldg.
CINCINNATI.....First National Bank Bldg.
NEW YORK.....1005 West Street Bldg.
PITTSBURG.....510 Park Bldg.
SEATTLE.....302 Pioneer Bldg.

*Correspondence on Marine Engineering, Ship
Building and Shipping Subjects Solicited.*

Subscription, U. S. and Mexico, \$3.00 per
annum. Canada, \$4.00. Foreign, \$4.50.
Subscribers can have addresses changed at will.

Change of advertising copy must reach this
office on Thursday preceding date
of publication.

The Cleveland News Co. will supply the trade
with the MARINE REVIEW through the
regular channels of the American
News Co.

European Agents, The International News
Company, Brems Building, Chancery
Lane, London, E. C., England.

Entered at the Post Office at Cleveland, Ohio,
as Second Class Matter.

September 17, 1908.

HISTORY OF WATERWAYS.

The National Rivers and Harbors Congress has prepared an interesting little monograph embodying the history of waterway improvement in the conventions of all the great political parties of the United States since the foundation of the government. Nowadays, when the development of waterways is a settled national function, it seems surprising that there should ever be a division of opinion upon the right of the government to engage in the improvement of internal waterways. Yet political parties were split asunder on this very subject, many statesmen distinguished in the history of the American government declaring that it was beyond the province of congress to appropriate public moneys for any such purpose. In fact the construction of the canal at Sault Ste. Marie, connecting Lake

Superior and Lake Huron, was delayed for years, through this very cause.

The National Rivers and Harbors Congress has done some service in putting into convenient form the history of the political parties upon this subject. The first declaration of any party upon the subject was made at the Democratic convention held in Baltimore in 1832 which nominated Andrew Jackson and Martin Van Buren. In the brief platform adopted by the convention this plank appears: "Resolved, That a uniform system of internal improvements, sustained and supported by the general government, is calculated to insure in the highest degree the harmony, the strength and the permanency of the republic."

The Whig and the Democratic presidential conventions of 1836 were silent on the subject of the improvement of inland waterways and even on the question of the right of the federal government to enter on a system of internal improvements, but the Free Soil convention which met in that year and nominated Martin Van Buren for the presidency had views on the subject and declared:

"Resolved, That river and harbor improvements when demanded by the safety and convenience of commerce with foreign nations or between the states are objects of national concern and that it is the duty of congress in the exercise of its constitutional powers to provide therefor."

From that time on until 1852 the Republican parties ignored the question of improvements to internal waterways, but in that year the Whig convention, nominating General Winfield Scott at Baltimore, incorporated this plank in its platform:

"Resolved, That the constitution vests in congress the power to open and repair harbors and remove obstructions from navigable rivers whenever such improvements are necessary for the common defense and for the protection and facility of commerce with foreign nations or among the states, said improvements being general in their character."

The Free Soil convention made a more emphatic declaration that year, adopting the following at their convention in Pittsburg:

"Resolved, That river and harbor improvements when necessary to the safety and convenience of commerce with foreign nations or between the states are objects of national concern and it is the duty of congress to provide for them."

The Democratic party appears to have undergone a change of heart since 1832, for in their convention held in Cincinnati in 1856 nominating Buchanan and Breckenridge, they denounced the right of congress to engage in work of general internal improvement in the following language:

"The constitution does not confer on the general government the power to commence and carry on a general system of internal improvements."

The Whig convention of 1856 was silent on the question, but the Republican convention of Philadelphia nominating Fremont and Dayton took ground in favor of the great work and adopted this plank:

"Resolved, That appropriations by the congress for improvement of rivers and harbors of a national character required for the accommodation and security of existing commerce are authorized by the constitution and justified by the obligation of the government to protect the lives and property of the citizens."

In 1860 the two Democratic conventions made no declaration. One convention was held at Charleston nominating Breckenridge and Lane, and the other at Baltimore nominating Douglas and Johnson. The Constitutional Union party nominating Bell and Everett made no declaration, but the Republican convention held at Chicago nominating Abraham Lincoln and Hannibal Hamlin reaffirmed the platform of the Fremont and Dayton convention, declaring that:

"Appropriations for river and harbor improvements of a national character required for the accommodation and facility of existing commerce are authorized by the constitution and justified by the obligation of govern-

ment to protect the lives and the property of the citizens."

No declarations were made by any party thereafter until 1880 when the Republican convention which nominated Garfield and Arthur declared:

"We deem it the duty of the congress to develop and improve our sea coasts and harbors."

The Democratic convention of this year made no declaration whatever. The subject was revived in 1884, although there was no declaration on the question that would satisfy the unanimity of demand of the present day and time brought about by the admitted necessity of permanent additions to the means of transportation in the way of improved waterways. In 1884 the Democratic convention nominating Cleveland and Hendricks declared:

"The federal government should care for and improve the Mississippi and other great waterways of the republic so as to secure for internal states easy and cheap transportation to tidewater."

In 1888 the Democratic convention had nothing to say, while the Republican convention nominating Harrison and Morton broached the subject slightly by its recommendations and approval of "appropriations for the necessary works of national importance in the improvement of harbors and the channels of internal, coastwise and foreign commerce."

The platform adopted by the Democratic convention in 1892 nominating Cleveland and Stevenson at Chicago took an advanced stand. The plank was as follows:

"Resolved, That the federal government should improve the Mississippi and other great waterways of the country so as to secure for the internal states easy and cheap transportation to tidewater, and when any waterway of the republic is of sufficient importance to demand the aid of the government, such aid should be extended on a definite plan until permanent improvement is secured."

The words "on a definite plan until permanent improvement is secured" were well in advance of the time, though that is the practice upon which all improvements is now followed. It is capable of even broader construction, through co-ordination.

The convention of 1896 nominating McKinley and Hobart at St. Louis was silent on the question while the Chicago convention nominating Bryan and Sewell adopted the plank of the Democratic convention of 1892. Neither the Democratic convention of 1900

nominating Bryan and Stevenson at Kansas City nor the Republican convention at Philadelphia nominating McKinley and Roosevelt had anything to say on the subject of inland waterway and harbor improvements. The convention nominating Roosevelt and Fairbanks at Chicago in 1904 was also silent, while the St. Louis convention nominating Parker and Davis adopted the following plank:

"We favor liberal appropriations for the care and improvement of the waterways of the country. When any waterway like the Mississippi is of sufficient importance to demand special aid of the government, such aid should be extended with a definite plan of continuous work until permanent improvement is secured."

The platforms of 1908 not only declare for the improvement of the waterways of the United States but go further in their recognition of the necessity for the conservation of the natural resources of the country which are intimately associated with the preservation of our forests. The Republican convention at Chicago said:

"We endorse the movement inaugurated by the administration for the conservation of natural resources; we approve all measures to prevent the waste of timber; we recommend the work now going on for the reclamation of arid land, and reaffirm the Republican policy of the free distribution of the available areas of the public domain to the landless settler. No obligation of the future is more insistent and none will result in greater blessings to posterity. In line with this splendid undertaking is the further duty, equally imperative, to enter upon a systematic improvement, upon a large and comprehensive plan, just to all portions of the country, of the waterways, harbors and great lakes, whose natural adaptability to the increasing traffic of the land is one of the greatest gifts of a benign Providence."

The Democratic convention of Denver states:

"Water furnishes the cheapest means of transportation and the national government, having control of the navigable waters, should improve them to their fullest capacity. We earnestly favor the immediate adoption of a liberal and comprehensive plan for improving every water course in the union which is justified by the needs of commerce, and to secure that end we favor, when practicable, the connection of the great lakes with the navigable rivers and with the gulf through the Mississippi river, and the

navigable rivers with each other, and the rivers, bays and sounds of our coasts to each other with artificial canals, with a view to perfecting a system of inland waterways to be navigated by vessels of standard draught. We favor the co-ordination of the various services of our government connected with waterways in one service for the purpose of aiding in the completion of such system of inland waterways, and we favor the creation of a fund ample for continuous work which shall be conducted under the direction of a commission of experts to be authorized by law."

This is doubtless the most complete and far-reaching declaration on the improvement of waterways that has ever been made. The subject should be looked at largely. Improvements should be projected upon a scale commensurate with the magnitude of the country. Improvements should be made not for a day or a year, but for all time. The sum of \$2,500,000,000 is none too much to spend upon this work during the next 50 years, but at the end of that time the country should not have an ill-planned system, benefiting only local communities, but a magnificent, co-ordinated system interlocking the entire country and worth every penny that was put into it.

PIG IRON SITUATION.

While the slowness of recovery of the iron and steel market in the past half year has been emphasized the past week, yet it is not safe to judge the future by that week's dullness. There is a prospect of railroads ordering 20,000 freight cars at an early date. The Steel Corporation has just announced plans for expending \$2,000,000 in rebuilding three blast furnaces at Ensley, Ala., and in making other improvements to the Tennessee plant. While melters of pig iron are taking metal under contract freely, sales are not large, and the price of southern iron has weakened. Sales of structural material generally are not heavy, but several large building projects have been closed. The drought has compelled a number of coke plants to close, and labor difficulties have also added to the coke region's embarrassment. Cast iron pipe makers have received contracts for a fair tonnage of pipe in the east and middle west. A large part of the business now going to plate makers is from wrought pipe manufacturers with contracts in the oil fields.

RETIREMENT OF MANAGER OF BUTE DOCKS.

Sir William Thomas Lewis, Bart., K. C. V. O., for 28 years manager of the Bute Docks at Cardiff, Wales, is about to retire from his successful direction of this great enterprise.

Lord Bute in 1889 appointed Sir William T. Lewis general manager of the Bute Docks, as well as the whole of his Welsh estate. This necessitated the relinquishment by Sir William of his large and remunerative practice as mining engineer to the Duchy of Lancaster and other important estates and works. So thoroughly did he succeed that in less than 12 months he effected such beneficial changes as to completely turn Lord Bute from his previous policy, and to resolve, under Sir William's advice, to go to Parliament for additional dock accommodation by the construction of the Roath Dock. At this time, however, it was absolutely necessary, in Sir William's opinion, to amend various existing arrangements which had proved detrimental to the trading interests of the port, and after protracted and bitter opposition from the Great Western, Taff Vale, and Rhymney railway companies, in the session of 1882 an act was obtained, and the Roath Dock works were soon commenced, and were opened for traffic on Aug. 24, 1887.

Some years previous to this the Barry company had been brought into existence, after two years of most bitter fighting, in which Sir William T. Lewis was on some occasions in the witness-box for four successive days defending his many improvements in the management, and contending that with movable appliances for coal shipment the Bute Docks could do far more work. These suggestions were treated by the Barry promoters with derision. However, before the Barry bill was again in committee, Sir William had erected a movable coaling crane on the Roath Basin, which was the precursor of the Lewis-Hunter cranes, and he also, in conjunction with the late Mr. George Taylor, erected a number of movable staithes on the Roath Basin, which have been a great advantage to shipowners by ensuring loading being completed in half the time taken at single fixed staithes, proving, further, that Sir William's estimated shipments were absolutely correct. Previous to the equipment of the Roath Dock Sir William, being so impressed with the importance of shipping the friable steam coal with

the least possible creation of small, decided, after long experiments in conjunction with the late Mr. C. Hunter, to adopt movable cranes of their invention. The idea was to receive the 10-ton cars of coal on the quay and transmit the coal into the hold of the ship. In practice this has been found to be of such enormous benefit in preserving the cargo during a long voyage that many large vessels will wait their turn for the Lewis-Hunter crane in preference to being loaded at the best modern staith.

In a few years after the opening of the Roath Dock in 1892 the trade, as well as the size of the ships, had so enormously increased that Sir William foresaw that unless Lord Bute provided further accommodation for the larger class of steamers the Bute Docks traffic must inevitably be reduced in volume, and after very long deliberation by the late Lord Bute and his trustees they decided to adopt Sir William's recommendation to reclaim from the sea by means of embankment about 350 acres of the foreshore, and construct thereon a gigantic deep water dock capable of accommodating the largest class of ships, and at the same time ensuring an improved entrance and exit for the existing docks. This work involved an embankment 40 ft. wide, and was a most difficult operation, under the personal supervision of Sir William Thomas Lewis. As a result, the Queen Alexandra Dock, opened by His Majesty King Edward in July, 1907, was proceeded with, and £2,000,000 of capital was expended upon it. This brought up the total area of the Bute Docks to 147 acres, as against 62 acres when Sir William took over the management in 1880, while the capacity for shipments increased from 6,300,000 tons to 16,000,000 tons in 1908. In addition to such dock extension, there has been all the necessary corresponding increase in size and number of dry docks, ship-repairing and engineering works, wagon works, and other conveniences required by ships and railways. Sir William T. Lewis also carried through the negotiations which resulted in the construction of the Cardiff-Dowlais Steel Works.

The improved traffic arrangements introduced by Sir William T. Lewis in the Bute docks bill of 1882 and in a special bill imposing upon the Taff Vale Co. the construction of storage and reception sidings for full and empty cars have resulted in increasing the value of colliery and shipping

properties by millions of pounds. They have prevented the demurrage on ships, and secured regular work six days a week for colliers, instead, as was the case previously, four days of irregular work. Of course, the whole of the railway companies taking traffic to the Bute docks bitterly opposed in parliament the responsibilities placed upon them, but Sir William succeeded against them, one after the other, and for years past his system of storage sidings has been in general application, not only at Cardiff, but at every port in the channel. The regular work at the collieries reduces to a very great extent the working cost of production.

Concurrent with constant fighting in parliament and preparations for succeeding sessions, during which the burden of the fights devolved upon him, Sir William gave constant, almost daily, attention to the duties of chairman of the Monmouthshire and South Wales sliding-scale committee for 18 years, and up to the close of the strike in 1898. He also devoted time to half a dozen royal commissions, upon which he acted as expert, and for many successive years was the chairman of the South Wales Coal Owners' Association.

NEW DOCK AT HONG KONG.

The shipping industry in Hong Kong is advancing by leaps and bounds, and it became evident some time ago that increased dry dock accommodation would have to be provided. Two docks were accordingly constructed, and those were recently publicly opened. The smaller of the two has been built by the British navy, and is of sufficient size to berth the Dreadnought. This naval dock will, of course, be devoted to the service of warships, and will not greatly affect commerce in the far east.

With the second, known as the Quarry Bay dock, it is quite otherwise, and it will have the greatest possible bearing on trade. Its construction is the result of private enterprise, and considerable engineering difficulties had to be overcome in its construction. Hong Kong is singularly unblest by nature with sites for works of any description; and, in fact, the only way to make roads, or get even sufficient level ground on which to build a house is by reclamation or excavation. No place could possibly have looked a less likely spot, five years ago, for the construction of a dock than the precipitous mountain headland which

ran out into the sea at Quarry Bay Point.

Labor, however, is the cheapest commodity in China, and an army of coolies have leveled the mountain to the ground. Like ants they worked on it—men, women, and children—and the not unmusical quick tap of the hammer on the ringing granite became one of the sounds which were listened for as Quarry Bay was approached. The granite thus hewn from the mountain has been used in the construction of the dock, the slipways, and all the immense works appertaining to a large ship building and repairing yard, and the result, even in its present unfinished state, presents an appearance of solidity and beauty that is remarkable. One does not associate beauty with engineering works usually, but the blue-gray granite reflects the sunshine, and the unsightly look of works in course of completion is wholly lacking here. By reclamation and the excavation 1,600,000 cu. yds. of material (51½ acres) of land have been added to the service of man, and three parts of the foundations of the works are of solid granite.

The dock itself is the largest in the far east, being 787 ft. long on the coping and 750 ft. on the keel blocks, with a width at the top of 120 ft. in the center and 83 ft. 6 in. at the bottom. It is built of cement concrete faced with granite, and is closed at the entrance with a sliding steel caisson weighing 400 tons.

On the southern side of the dock three large slipways are in course of completion. Slipway No. 1 is claimed to be the largest in the world, and is 1,030 ft. long and 80 ft. wide.

"It is very difficult," says the correspondent who sends us the photographs from which our engravings have been prepared, "for westerners to realize the up-to-datedness in engineering matters of these far-distant colonies, and one certainly finds it hard to associate the new Quarry Bay dock yard with a small island off the China coast."

There are no docks in Japan, the Straits Settlements, or the Philippines that can in any manner compete with this latest addition to far eastern facilities, and the new dock cannot fail to have the very greatest influence on commerce between east and west.

The grain barge P. P. Miller went aground north of White Lake harbor but was released without damage,

PROPOSED CHICAGO-TOLEDO CANAL.

Much interest is being evinced in all parts of the country regarding the projected waterway from Chicago to Toledo, O., the construction of which would reduce the present lake route by 500 miles.

The Chicago Association of Commerce has taken up the project and will endeavor to push the cause through its deep waterways commission. This commission is now actively engaged in exploiting the lakes-to-the-gulf deep waterway plan, but so soon as that is well in hand will take up the Chicago-Toledo work in earnest.

The canal, as proposed, would be 244 miles long and 20 ft. deep. It would start below South Chicago, cut across Michigan, and strike the lake about the entrance of the Maumee river, 10 miles below Toledo. From this point traffic could be diverted up the river to the great elevators at and above Toledo, or a straightaway run for Buffalo and Lake Ontario would be open.

Captain William C. Clark, who has given the question of water transportation careful study, said recently that the agitation for such a waterway was merely another indication of the very general awakening to the superiority of water freight transportation over railroad and land carriage in availability and dispatch. The New York Central & Hudson River, the Pennsylvania, the Erie, the Delaware & Lackawanna, the Lehigh Valley and other great trunk line railroads have for many years owned and operated their own propeller lines on the Great Lakes between Buffalo, Chicago and other great western ports. Railroads have recently been claiming great losses because of the overwhelming advantage of waterways over railroads in moving freights. Even debt-burdened Russia is about to commence the expenditure of \$800,000,000 in the vast improvement of her canal system; some of her great water highways of commerce are to be provided with a uniform depth of 35 ft. of water. In this line of water transportation improvement the great Mississippi river and tributaries are to be extensively improved at no distant dates, while New York's own barge canals connecting Lakes Erie, Ontario and Champlain with the Atlantic ocean, are under slow progress of construction. "When our state barge canals are completed," continued the speaker, "they will prove to

be the most beneficial work of the kind ever attempted and consummated in the history of man.

"Following immediately upon the heels of these greatest of undertakings comes a perfectly feasible proposition of shortening the great water route—a long stretch of 500 miles between New York and Chicago—by cutting a canal across the peninsula from Lakes Michigan to Erie known as the state of Michigan. Nor is this all the advantage to be gained by excavating this short-cut canal across that flat stretch of territory. It will not only shorten the water route to the great advantage of producers and consumers living in a large section of our great common country, but it will also build up a wide stretch of country through which it directly passes. Last, but not least, it will prolong the great lakes navigation season for weeks both in the spring and fall, because of the fact that it goes far to the southward of the Mackinaw Straits, or the present route bordering along the cold Canadian shore. There is every argument to be made for speedy commencement and the hasty completion of this work, and it is just the time now to do it in these times of business depression when an army of the unemployed are seeking after something to do. At this juncture it will not only prove a God-send to thousands of willing workers in a large line of trades and callings, but will also prove a safe and sound investment, for every dollar honestly expended thereon by the directly interested states will be returned to them over and again in expediting and cheapening the cost of transportation for the benefit of the people living in a very large section of the United States.

"The proposition as put forth is to excavate this ship canal to a 20-ft. depth with corresponding locks and widened channel. My idea is that this great short-cut canal should be provided with at least 25-ft. depth of water to accommodate the future grain, flour, provision, iron, ore, steel, coal, copper, lead, stone, lumber and other available products. This canal would then be 10 ft. shallower than debt-burdened Russia is going to give her 1,000-mile link canal, which is not a short-cut-off waterway like this of only 250 miles long at the most. Our Canadian neighbors have been making hay while the sun has shone in providing free terminal and waterway transportation facilities at a vast

expense, while our rich commonwealths have been bickering over taxes and expenses and the haggling over that which must be done. The worst taxation that can possibly be inflicted upon New York and sister states is the loss of farming, manufacturing, importing and exporting business in not providing adequate water and port terminal facilities, for enough has already manifested itself in the loss of commerce to be severely felt by all classes of our citizens."

LAKE FREIGHT SITUATION.

The promised improvement in the ore trade has not materialized. Shippers are reluctant to forward ore while furnace interests appear so indifferent in ordering. Moreover, dock space is limited and unless ore moves more freely into the valleys during the next few weeks, shipments from upper lake ports will cease earlier than usual. Obviously there is not much in such a condition for the wild vessel, shippers having all that they can do to take care of contract tonnage.

As far as the coal trade is concerned, it has not improved during the week.

The grain trade naturally took quite a brace but as offerings of tonnage were liberal the rates continued low. It looks now as though the lake season would not have a firm finish, but would end weak.

The movement of vessels during the week has been seriously delayed by smoke. In the rivers it was so thick that vessels were compelled to anchor. The forest fires which have been raging in the upper Lake Superior country during the past 10 days have caused a pall of smoke to overhang the entire chain of lakes. The fires must have been of an extensive character as the lower lake cities, nearly 1,000 miles away, were enveloped in smoke that was almost as dense as a London fog. Many vessels fetched up in shoal water.

CAPT. CORRIGAN ILL.

Capt. James Corrigan, senior member of the firm of Corrigan, McKinney & Co., is dangerously ill at his home in Wickliffe. His life was despaired of on Tuesday but on Wednesday night physicians reported that he had a fighting chance. He is suffering from an attack of peritonitis. Capt. Corrigan is one of the industrial leaders in the lake region, being heavily interested in mines, furnaces and ships. He was at one time associated in business with John D. Rockefeller.

AROUND THE GREAT LAKES.

Capt. Dunn, of the fisheries cruiser Vigilant will retire within a month and will be succeeded by Capt. Robertson, who has for some years been first officer of the Curlew stationed in the Bay of Fundy.

L. O. Willix, chief engineer of the Cambria of the Pittsburg Steamship Co.'s fleet has been transferred to the Neilson.

About eight plates will have to come off the steamer W. B. Kerr which was in collision with the steamer Buffalo at Duluth recently, and three or four will have to be replaced with new ones. About four frames will come out and all of the braces and part of the tank top.

The passenger steamer City of Chatham has been placed on the run between Pelee Island and Kingsville. She formerly ran between Detroit and Chatham, but if the new route develops she will probably remain permanently on the Pelee Island run.

The passenger steamer Conestoga which ran aground on Little Traverse Island, was released by the tug Daniel Hebard and taken to Houghton.

Capt. W. W. Smith, marine superintendent of the Pittsburg Steamship Co., took the steamer Thomas Lynch to Ashtabula, relieving Capt. E. M. Smith who had to be sent to a hospital in Duluth.

The steamer Winnipeg, bound for Racine with soft coal, went ashore two miles below Cheboygan in the dense smoke. She was released after jettisoning about 350 tons of coal.

The steamer E. B. Osler of the St. Lawrence & Chicago Steam Navigation Co.'s fleet, bound up with coal, grounded at Bar Point in the dense smoke.

The steamer Goodyear which went on Grassy Island in the smoke was released by the tug Harding after lightering part of her fuel. As she was apparently uninjured she proceeded on her way.

As a result of the trial which followed the investigation of the collision between the steamer Britannia and the City of Alpena in the Detroit river Sunday, June 21, the local inspectors have suspended Capt. R. E. Ferguson, of the Britannia, for 60 days beginning Sept. 4.

The steamer A. E. Nettleton struck an obstruction when leaving the Canadian canal at the Sault, doing some damage to her bottom. The obstruction has been located abreast of the new Ontario coal dock, 75 ft. from the middle of the ranges on the west side. The channel is now being swept

and masters are cautioned not to get to the westward of the ranges until after passing the coal dock.

The second anchor lost by the barge Carrington near Port Huron has been recovered.

The steamer George B. Owen sprung a leak while taking on a cargo of coal at the Ellsworth dock in the outer harbor at Cleveland this week. As the water was gaining rapidly on the pumps she was towed under the west breakwater and beached.

The steamer Arthur Hawgood, bound down with ore, grounded at Bar Point.

The steamer Eastern States of the D. & B. Line lost her kedge anchor near Southeast Shoal on Monday last. She anchored in the fog until she could pick up the shoal and while the anchor was being recovered the chain broke.

The steamer Ball Brothers went on the rocks about 14 miles west of Detour in the prevailing smoke. She subsequently released herself.

The new light marking Duluth north pier went into commission on the night of Sept. 16. There are six lights arranged on three poles. Each pole has two arms and each pole carries a white light and a green light. The red flash light and red stationary light will remain on the south pier.

The steamer Nyack of the Crosby Transportation Co.'s fleet stranded on a sand bar near Red Bank Buoy in Muskegon Lake. The Nyack went on in the dense smoke prevailing. A tug went to her relief.

The steamer A. A. Carpenter sprung a leak inside the Manitowoc breakwater last week and was slightly damaged.

A claim for damages has been filed against the steamer Roosevelt by Capt. Wm. Williamson of the schooner Iris for damages to the schooner when the Roosevelt struck her leaving Manitowoc harbor.

According to a recent consular report the business men of Christiana, Norway, are about to establish a steamship line from Bergen to New York. An increase in the passenger and freight business between these ports has given rise to the movement, and a stock company is to be formed with a capital of \$2,700,000. It is considered by those interested that the beauties of Norway have never been properly exploited in the United States, and that the establishment of a direct line will attract hundreds of tourists. It is expected that the voyage will consume seven or eight days, the steamers to be triple-screw turbine vessels, two in number.

CRISTOBAL MARINE SHOP AND DRY DOCK.

A self-propelling lighter and floating crane, the Alexandre La Valley, is in the dry dock at Cristobal, undergoing extensive repairs. She was put in commission 17 years ago, and this is the first time she has been sent to dry dock. In fact, the severely damaged classes of our citizens."

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Nearby is a pontoon recently made, and a pile of stay bolts just turned out for the trestles at Gatun dam. In the machine shop a tail shaft has just been completed for the old French claret, No. 14, and a propeller has just been bored to fit it. An engine is being rebuilt for the tug Grace, and the engine of claret No. 2 is being overhauled. A 14-in. shaft is being made for the top tumbler of one of the old French dredges.

These examples of the work done at

the Cristobal Machine Shop and Dry Dock are not comprehensive, but they give a fair idea of the class and amount of work turned out by the 90 mechanics and 250 helpers. The plant is an adjunct of the Atlantic division, and is under the immediate supervision of Assistant Engineer R. B. Smith, who

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As a result of the fire, by 130 a. m., and the machinery is arranged along one side, leaving the other side vacant for the machines recently ordered. In this shop are one 96-in. vertical boring mill; three lathes, 36-in. by 24-ft., 26-in. by 12-ft., and 32-in. by 16-ft., respectively; one 36-in. by 8-ft. planer; one 6-in. pipe machine; one 2-in. pipe machine; one emery grinder; one 10-ft. radial drill; one 28-in. drill and one French shear. Two jib cranes do the heavy lifting, and light lifts are made with three portable cranes. In addition to these machines

there have been ordered and will be installed presently, one slotter; one 30-in. by 10-in. by 18-in. Universal milling machine; one stay bolt cutter to cut machine; one cold saw; one power hack saw; one pair of flanging clamps to handle 12-ft. plates; one 100-ton hydraulic crane.

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Shipping news, August consular report

The five new British torpedo boat destroyers, Nubian, Crusader, Maori, Zulu and Viking, which are to be built by private contract, are to have a displacement of 900 tons each, which is slightly in excess of the 33-knot destroyers of the Tribal class, the Saracen, the largest of that class, having a displacement of 893 tons, and the Afridi, the smallest, having a displacement of 795 tons. The new destroyers are to be fitted with turbines and oil burning machinery.

QUESTIONS FOR MASTERS AND MATES.—NO. 12.

175. How many degrees of longitude equal one hour of time?

176. Is the length of a degree of longitude greater on the equator than elsewhere on the earth?

177. The length of a degree of longitude on the parallel of 60 degrees is just one-half the length of a degree on the equator; in one hour's time does the sun pass over or through the same number of degrees on the equator as on the parallel of 60 degrees?

178. If the degrees of longitude vary in length in different latitudes, how do you account for the sun passing over the same number of degrees in a given time in all latitudes?

179. Show that the influence of the earth's magnetism upon a magnetic needle is merely directive.

180. How can the intensity of different parts of a magnetic field be roughly estimated from the behavior of a magnetic needle?

181. A coal bunker 25 ft. in length by 8 ft. in breadth and 10 ft. in depth will hold how many tons of coal, figuring the coal (soft) at 45 cu. ft. to the ton?

182. There are 231 cu. in. in a gallon of water. A cubic foot of water (equals 1,728 cu. in.) weighs 62.42 lbs. A tank 20 ft. long by 5 ft. wide and 4 ft. deep filled with water will hold how many gallons and what will be its weight?

183. Does an isogonic line indicate the direction of the magnetic needle?

184. The wind is N x E, a vessel sailing close hauled, heads NE x E $\frac{1}{2}$ E on the port tack, how will she head by compass (no deviation) when close hauled on the starboard tack?

185. If a sailing vessel can steer $5\frac{1}{2}$ points from the wind when close hauled, how will she head on the starboard tack with the wind SE?

186. A sailing vessel close hauled heads SW, and $4\frac{3}{4}$ points from the wind being on the port tack, what is the direction of the wind?

187. Your boat carries 6,000 tons of coal; figuring 40 cu. ft. to the ton, how many bushels of space does your coal cargo occupy, allowing 2,150.5 cu. in. to a bushel?

188. Ore, coal, etc., is carried by the gross or long ton, (2,240 lbs.) but the boat gets pay only for net tons, that is, she must carry 2,240 lbs. to get pay for 2,000 lbs. The steamer H. H. Rogers recently carried 15,000 gross tons of ore, for how many tons did she receive pay?

189. How many fathoms in a nautical mile?

ANSWERS TO QUESTIONS FOR MASTERS AND MATES.—NO. 12.

175. 15 degrees.

176. Yes.

177. Yes.

178. Yes. The same angle of any circle, great or small, contains an equal number of degrees, the space between the degrees varying with the size of the circle. As one goes north or south from the equator the circles of latitude decrease in size and consequently the space between the degrees vary accordingly. The earth rotating at an uniform rate of speed exposes to the sun in a given space of time the same number of degrees of arc in any latitude. If the length of a degree of longitude on the parallel of 60 degrees is shorter than a degree on the equator, it moves correspondingly slower, just as a spot near the hub of a wheel travels slower than a spot near the rim, but it covers the same number of degrees of arc in a given time.

179. When a magnetic needle is balanced from its center of gravity the earth's magnetism gives it directive power and causes it to point toward the magnetic poles of the earth. The earth's magnetism manifests no tendency to move the magnet bodily through space toward the poles, except in azimuth, and the magnet must be balanced before it will turn or swing. Magnetizing a needle makes no change in its physical condition other than to give it directive power, and it neither adds nor detracts from its weight.

180. By bringing a balanced magnetic needle into the magnetic field and finding the points of greatest disturbance. By oscillating the needle at different portions of the field and noting the time it takes the needle to return to a state of rest.

181. $25 \times 8 \times 10$ equals 2,000 cubic feet. 2,000 divided by 45 equals 44.44 tons, answer.

182. $20 \times 5 \times 4$ equals 400 cu. ft. $400 \times 1,728$ equals 691,200 cu. in., which divided by 231 equals 2,992.2, which is gallons tank will hold. 400×62.42 equals 24,968 lbs. weight.

183. No, it simply marks the places having an equal amount of variation of the same name.

184. NW $\frac{1}{2}$ N.

185. ENE $\frac{1}{2}$ E.

186. S $\frac{3}{4}$ E.

187. $6,000 \times 40$ equals 240,000 cu. ft. $240,000 \times 1,728$ equals 414,720,000

and this divided by 2,150.5 equals 192,838.4 bushels. Answer.

188. A net ton is 0.89 of a gross ton. $15,000 \times 0.89$ equals 13,350 net tons.

189. 1,013 $\frac{1}{3}$ fathoms.

NAVAL SURVEYS.

The hydrographer of the British navy, in his annual report, states that during 1907 no fewer than 508 rocks and shoals dangerous to navigation were reported. Of these, 36 were discovered by vessels striking on them, 117 were reported by surveying ships, 23 by other of His Majesty's ships, 33 by various British and foreign vessels, and 299 by colonial and foreign governments, while in the same period 39 previously reported dangers were expunged from the charts. His Majesty's surveying vessels were fully employed during the year under review. Two vessels, the *Fantome* and the *Mutine*, have been commissioned for the first time for the surveying service, and the *Sealark* entered upon her second commission. The *Rambler*, *Penguin*, and *Goldfinch* have ceased to be employed for surveying duties, their places being taken by a more modern type of vessel. During 1907 a length of 656 miles of coast line was charted, and an area of 4,436 square miles sounded over by His Majesty's surveying vessels.

EVENING COURSES FOR TECHNICAL MEN.

Columbia University will offer at night during the year 1908-09 20 evening courses especially adapted to the needs of technical and professional workers. This includes work in Applied Mechanics, Applied Physics, Architecture, Electricity, Fine Arts, Industrial Chemistry, Mathematics, and Surveying and Structures. The work begins on Oct. 26, and continues for 25 weeks. A full description of the courses is contained in the Announcement of Extension Teaching, which may be obtained on application to the Director of Extension Teaching, Columbia University, New York City.

The steamer *Laurentic* for the Canadian service of the White Star Line was launched at Belfast on Sept. 10. The *Laurentic* is a combination reciprocating and turbine driven steamer. She will have three screws, the wing propellers being driven by reciprocating engines and the center propeller by a turbine. The *Laurentic* will be the largest vessel in the Canadian trade, registering 14,500 tons gross and measuring 565 ft. in length and 67 ft. 4 in. in width.

Pacific Coast Shipping Demoralized.

George F. Thorndyke, manager of the Globe Navigation Co., Seattle, Wash., has written a letter to the Seattle chamber of commerce protesting against the deplorable condition of coastwise shipping on the Pacific coast owing to the presence there of the large fleet of foreign colliers that accompanied the battleship squadron on its recent cruise. This letter makes a powerful appeal for fair play to the American merchant marine and as it is a literal indictment of the policy of the navy department the letter has been referred to Assistant Secretary Newberry of the navy department. Mr. Thorndyke points out very clearly how these ships have demoralized shipping. Having delivered their cargoes of coal, they naturally seek return cargoes and will take them at any price in order to avoid returning in ballast. So drastic has been the manner in which they have cut into the trade that one broker alone has lost between \$30,000 and \$40,000 in commission, which would mean a decrease of \$600,000 in actual business. Moreover they directly effect the coastwise trade, especially in the delivery of coal to Behring Sea. Mr. Thorndyke's letter is a mighty important document. It reveals a situation that congress should be called upon to remedy. The text of his letter follows:

"A great depression in shipping prevails on the Pacific coast at the present time. There has been a falling off in our trade in various commodities to foreign countries, due somewhat to financial depression; but said decrease does not, in my opinion, exceed 15 per cent, which opinion is backed up by inquiries at the publishing offices of some of our trade journals. Our coastwise lumber trade has suffered terribly because of the general slump and financial depression. I believe however, generally speaking, that our exports (deep water trade), show an increase for the past summer of exports for the corresponding months in 1907. There is a long list of American vessels usually employed in coastwise business idle, many of which could be employed in the foreign lumber business if fair living rates could be obtained; but there has been for some time, and is at present, cut throat rates in existence for all over ocean carriers from this coast. This rate war has practically depleted the market because of the presence on this coast since early last winter, and up to the present time, of a mammoth tonnage of foreign tramp steamships which prey on the market for cargo to take them away, accepting business at all sorts of ridiculous prices in order to reap some revenue, be it ever so small. Just prior to the arrival of the Atlantic

battleship fleet on the Pacific, the war department made deliveries of Atlantic coast coal at various points, engaging for transportation thereof, foreign tramp steamers having a gross capacity of about 225,000 tons. There is at present a list of some twelve steamships of foreign register now enroute from the Atlantic to the Pacific coast with fuel for naval vessels of the United States, and whose capacity aggregate about 75,000 tons. These ships were chartered to the navy department on a tonnage basis, that is to say, they are paid by the navy department a certain rate per ton for the delivery of cargoes on this coast. After they have made such deliveries the vessels have been, and will be, free to accept any other business offering. It has therefore resulted that foreign ships to the capacity aggregating about 300,000 tons all told, have through their service with our government been able to break into the trade of our regular lines operating from the Pacific coast thereby demoralizing rates, and almost completely depleting the cargo business, with the result that American that would be capable of carrying freight to foreign countries, are laid up and out of commission.

"The harm that has already been done cannot be well remedied; but if proper representation can be made to proper authorities, it would seem as if future cargoes of fuel could be transported to the Pacific even if in foreign vessels under an arrangement, whereby owners of those vessels would agree to keep out of the Pacific coast over-ocean trade, after they have made their deliveries of cargoes. In other words, there should be a great effort made by our government to protect the shipping industry of this coast, to charter these vessels on a time charter basis, or other similar arrangement, so that the vessels could be redelivered to the Atlantic coast without disturbing conditions here. I will admit that the cost to the government would be somewhat greater than if shipments were made on a tonnage basis; but I am certain that if usual business methods are employed, suitable vessels could be chartered for about \$3,500 per month, or \$21,000 for six months (customary round voyage). The fuel should cost from about \$15,000 to \$17,500 per voyage, making an aggregate cost of about \$36,000 to \$38,500 per ship, while I am certain it did cost the government under present charters in excess of \$40,000 to make deliveries here of cargoes in certain individual ships.

"I take the liberty of placing this matter before you, well knowing your interest in our merchant marine, and to illustrate to you that the government through

undue consideration in this transaction is dealing a fatal blow to our industry, yet our administration is definitely committed to assist American shipping, and in this instance is aiding and abetting foreign ships to simply crush us.

"It is the custom of many large shipping companies upon chartering extra ships, to incorporate in the charter party a provision depriving the owners of the chartered vessel, the right to compete with the charterer by accepting return cargoes between the same ports, even if the charter was for only one way. I believe it would be consistent for the government to so arrange its charters so as to similarly protect our shipping interests. Such an arrangement would undoubtedly cost the government more than if contract were made without the provision; but it would be eminently better for the whole people, through the government to stand the burden, rather than to saddle the terrific loss and demoralization of business upon a few shipowners.

"The government will undoubtedly keep the Pacific cruiser fleet on this coast for an indefinite period. These vessels are all large fuel burners, and it will be necessary for the government to keep colliers in operation between the Atlantic and the Pacific in order to supply fuel to their cruisers. If the present method for chartering is continued the present demoralization in shipping matters will continue just as long as the government continue their form of chartering. To serve to illustrate to you the havoc created by these foreign tramps, I would explain that a shipping man prominent in the Oriental trade, informed me last week the commissions in his business, owing to the presence here of the foreign coal fleet fell off \$30,000/\$40,000, which means the regular lines he handles to the Orient suffered a decrease in business to the extent of about \$600,000. Two American steamers regularly employed between Puget Sound and the Orient, since last fall, have been operated at a loss of about \$40,000 per voyage, or at a rate of about \$100,000 per year each. I have heard for some weeks that the owners of the "Minnesota" have about decided to lay her up, at which news I am not at all surprised. When the vessel was placed in the Oriental trade she carried very good cargoes; since last fall they have dwindled to that extent that she has sailed on individual voyages from here with about one-tenth of a cargo. While the regular lines and American ships are being thus butchered, tramp steamers in the employ of the government are arriving weekly on this coast with cargoes of coal, then taking cargoes from the coast at any rate they can secure. It is oftentimes said by those uninformed, that the presence here of the massive idle foreign tonnage does not affect the coastwise busi-

ness. This is not a fact; such tonnage does affect and depress our coastwise business; in such a similar manner as it does the foreign business. For instance, during the past several years, we have supplied large quantities of our King County coal to the various ports in Behring Sea, because the coal was cheaper than British Columbia coal, and could be freighted just as cheap as could the latter. This year however, tramp steamers have been carrying cargoes of coal from British Columbia to Nome at so low a rate as \$2.60 per ton, such a rate has enabled the British Columbia mine owners to deliver their coal at Behring Sea points at even less price than is possible to make such deliveries from here. Then again, our larger vessels are forced from the foreign trade, and have been preying on the coastwise business with the results that rate cutting obtains in the latter trade, and has obtained all summer long. The normal freight rate for lumber per thousand from Puget Sound to San Francisco is \$4.00 per M. ft. B. M., and to southern California ports \$5.00 per M. ft. B. M. The current rate to San Francisco is \$3.00, and to southern California ports \$4.00, and I have letters from our correspondents in San Francisco, stating that actual charters have been made to southern California ports at \$3.50 per M. ft. B. M. These rates are made because of desperation on the part of vessel owners, hoping by keeping them operated even at a loss, they will avoid depreciation and keep free from marshal hands. Shipping is in an almost desperate condition, and something must be done, and that speedily to give it assistance. The government must be made to see the havoc they are creating, and must discontinue its present policy in chartering colliers, and must proceed to give us the assistance that various politicians are promising when they agree to work in the interests, and for the betterment of our merchant marine.

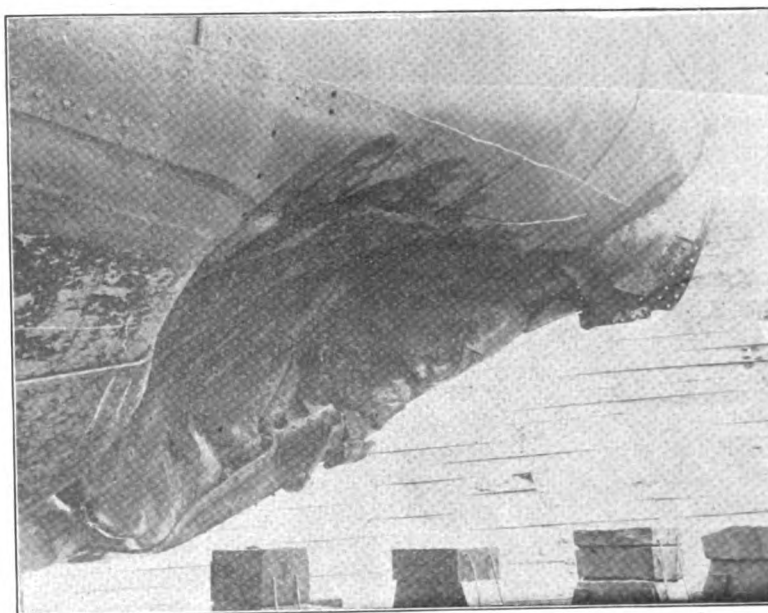
"I shall be very glad if you can give us any assistance in this matter, and trust you will find a way if possible to put this question before our Pacific coast congressional representatives. I know that it is natural to suppose that because of the lower rates, sales and shipments have increased incident to the rate war, that have not proven to be the case; but because of the cut rates foreign market has been flooded, and the regular steady trade practically obliterated."

The new schooner Victory, which has been lying at the yard of her builders at Portland, Maine, since being launched a year ago, has been sold to the Gilbert Transportation Co., of New Haven, Conn. The same company has also purchased the schooner Charles Woolsey, which was recently run down by a steamer and towed into New London, Conn.

STEAMER DANIEL B. MEACHAM DAMAGED.

Photographs are herewith published showing the injuries sustained by the

Meacham. Similar complaints have been made by other captains. The phenomenon is probably due to atmospheric influence, and it has been suggested that the character of warning

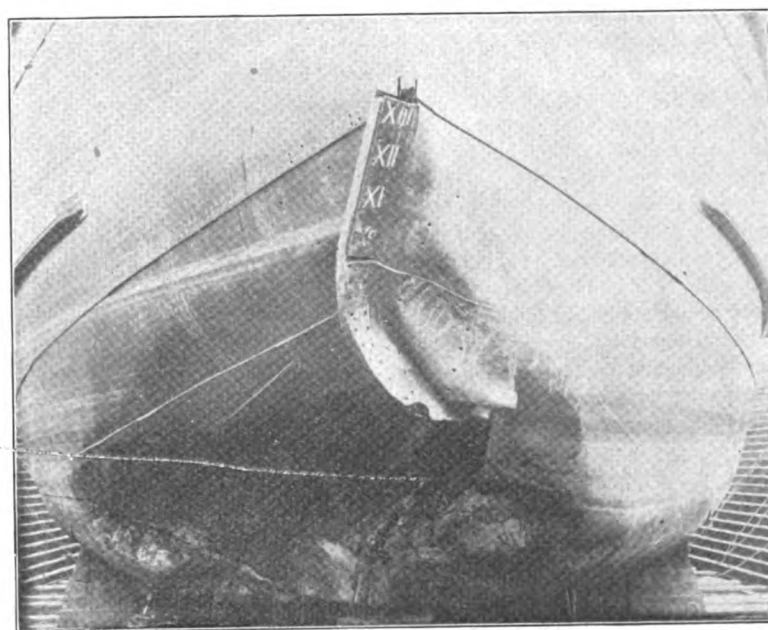


MEACHAM IN DRY DOCK, SHOWING INJURIES TO BOW.

steamer Daniel B. Meacham which grounded on Passage Island, Lake Superior, on July 28, while bound with coal from Ashtabula to Fort Williams. At the time the Meacham grounded she was proceeding with caution at the rate of about five miles per hour

be changed to one more definite, such as submarine signaling.

The Meacham was on her maiden trip at the time and by reason of the accident was taken out of service practically for the whole month of August. Thirty-three plates had



MEACHAM IN DRY DOCK, SHOWING INJURIES TO BOW.

through a dense fog. The captain complained that the whistle at Passage Island is misleading in its character. When sounded it appears to come from a great distance whereas the ship may be almost immediately upon it. Such was the case with the

to come off and she had to be given a new stem. The work was done at the West Superior yard of the American Ship Building Co. James Nacey, of Nacey & Hynd, naval architects of Cleveland, superintended the work for the owners.

EKENBERG POWDERED MILK.

The manufacture of Ekenberg powdered milk, which has been generally introduced aboard lake vessels during the past season, is thoroughly described in a recent issue of the *Scientific American*. It is now about five years since Dr. Martin Ekenberg, the eminent Swedish scientist, delivered a lecture before the Royal Academy of Agriculture in Stockholm describing the process which he had then just envolved for the production of dried milk in an entirely new form, and in which the constituents of the liquid were perfectly retained. Since that date several improvements in the process have been effected and at the present time there are several factories in Sweden and other countries where the production of the milk powder is being carried out on an extensive commercial scale.

While there is no food which can take the place of milk in its various uses, there is at the same time no dietary article which is more difficult of distribution, as it is extremely sensitive, and liable to rapid changes and sour fermentations. The reason is that the liquid is composed of 88 per cent of water, in which the solid food substances are dissolved and suspended; and among these latter substances there is one most subtle class, i. e., the albumenoids. It is clear that the great amount of water present renders the milk remarkably susceptible to the propagation of bacteria, while at the same time its bulk militates against cheap and easy transportation.

Numerous efforts toward preserving the solid substances present by the elimination of the water have been made since the early years of the past century, but the difficulties encountered in entirely extracting the water and the inefficient mechanical means then available were such that the attempts toward producing powdered milk were perforce abandoned, and the production of the milk in a condensed form perfected. In this process the milk is converted into a thick liquid which, especially in the presence of cane or beet sugar, has keeping qualities sufficient to render it an article of commerce easily transportable. But although the milk is considerably decreased in bulk by the process of condensing, exploration in the tropics, and long sea and land expeditions, when all requisite food supplies have to be carried from the very start, rendered it apparent that a further diminution in the bulk was desirable, not only in regard to weight but also in order to obtain a better keeping quality, since it is imperative with the condensed product that the can in which it is carried should be absolutely airtight. Furthermore, condensed milk is somewhat monotonous as a daily food owing to its extreme sweetness. Consequently the old question of reducing the fresh

milk to a dry powdered form again impressed itself upon scientists, and numerous experiments to overcome the obstacles which had proved insurmountable to the pioneers in this direction were carried out, among them being Dr. Ekenberg's.

In these renewed efforts the investigators were appreciably assisted by the entire revolution that had taken place in the dairy industry by the introduction of the centrifugal skimming or separating machine, which rendered the practical utilization of the resultant skimmed milk a question of vital importance, since the milk, being deprived of the greater proportion of the cream, was rendered unmarketable in the usual manner, so that it became somewhat of a by or waste product. But at the same time, although the separator made it possible for inland dairies, whence transportation of the raw fresh liquid was difficult, to produce a salable and remunerative article in the form of butter, yet the bulk of the milk—skimmed milk—containing the most valuable parts from a physiological point of view, was left behind.

The operation of extracting the water and converting the milk into a powder appears at first sight to be somewhat simple, but in such a process care must be observed that the resultant product has none of its original and valuable properties destroyed or impaired. The powder generally known as "dry milk," although made from milk, is in reality no longer milk, nor can it be re-converted into milk, though owing to its nutritious value it is used extensively as an emergency food. In the Ekenberg process, however, the powdered milk, as it is termed, is actually dry milk easily soluble in water, and which, when reconstructed into its liquid form by the correct proportionate addition of water, becomes in every way similar to the original substance. Dr. Ekenberg discovered his process in 1899, but during the ensuing years many important improvements have been effected whereby the cost of producing the powder is now quite nominal, so that the product can compete commercially with either the fresh or condensed milk.

The feature of the Ekenberg process is that the heavy percentage of water present in the fresh separated liquid is rapidly evaporated at a low temperature under vacuum, the temperature at no stage of the operations being much higher than luke-warm. Upon arrival at the factory, the cans of milk are emptied into a small reservoir on the ground floor and then pumped to the receiving tanks located in the floors above. In Sweden, owing to regulations concerning milk, it is pasteurized at the dairies before being dispatched to market, so that at the milk factory this preliminary process is avoided. In

other countries, however, where such regulations do not obtain, pasteurization is carried out before the elimination of the water is proceeded with. All empty cans are carefully and thoroughly sterilized with steam before being returned to the dairies. The milk is first filtered through a cotton medium whereby all foreign substances in suspension are arrested. It is then cooled by means of refrigerators to a point just above freezing and is kept at this temperature during the day's work.

The process of converting milk into powder consists in quickly drying the milk at the temperature of the blood or approximately 100 deg. F. For this operation a specially constructed apparatus evolved by the inventor and known as the "Exsiccator" (milk dryer) is utilized. In the majority of processes for extracting the water the milk is passed over or between rollers heated to a very high temperature, the powder being deposited upon the external surface of the rollers, from which it is subsequently removed by scraping devices. In the Ekenberg system the powder is deposited upon the inner face of a vacuum vessel. The exsiccator comprises a large, horizontal, cylindrical drum which is caused to revolve. The internal face of this drum is of nickel, which has been proved to be the most suitable metal for the purpose. The milk enters the exsiccator department through a floor standpipe, to which flexible pipes extend from each exsiccator, it being possible to provide as many supply pipes from this central source as there are machines for drying the milk. The supply is maintained by gravitation, the capacious tanks containing the raw milk being placed at suitable points above. The heating medium employed for evaporating the milk is exhaust steam, which is admitted to the interior of the drum when closed. In order to obtain high efficiency and rapid treatment the ends of the drum form bowls, dished outward, in which evaporation of the water to an extent of about four-fifths of the original amount takes place; here an evaporation effect of 160 to 180 kilogrammes per hour per square meter (295 to 330 pounds per square yard) is obtained, which is a higher result than has hitherto been possible, since a locomotive boiler, for instance, evaporates only 40 kilogrammes and a sugar vacuum from 60 and 80 to 100 kilogrammes per hour per square meter. This high evaporating efficiency is obtained by maintaining the milk in constant circulation. The solids of the liquid are deposited upon the nickel surface of the drum and are removed by means of German silver knives and deposited in a special receptacle close to the drum, this vessel being arranged for a periodic discharge of its contents either by hand or by a mechanical device. Upon

the removal of the dry milk powder from the exsiccator it is submitted to a crystallizing process in a special chamber at a temperature ranging from 80 to 100 deg. F. It is left within this chamber for approximately one hour or until the sugar of milk has thoroughly crystallized. In this crystalline state the substance is of a very brittle nature and is now submitted to grinding and sifting operations in a mill in precisely the same manner as wheat flour, after which it is ready for packing in either tins, boxes, or barrels.

The exsiccators of the size in general use at the factories now in operation have a drying capacity of from 800 to 1,000 liters (211 to 264 gallons) of milk per hour, or about 15,000 liters (3,962 gallons) per day and night, allowing sufficient intervals for cleansing and emptying the machine. The consumption of steam is low, 100 liters (26 gallons) of milk requiring from 90 to 93 kilogrammes (198 to 205 pounds) of steam for complete drying. The cost of producing the powdered milk is also sufficiently low to render it commercially practicable, the cost of extracting the solids from one gallon of milk amounting to one cent, inclusive of wages, coal, steam-raising, depreciation of plant, and other establishment and maintenance expenses. This low price is furthermore reduced by the economy effected in the transportation of the dried product, owing to its greatly reduced bulk, which is one-tenth of the liquid milk. Powdered milk prepared on this system is therefore not dearer, but cheaper, than the fresh liquid article to the consumer, especially in view of the fact that the fresh milk can be obtained from those parts of the country where it is locally very cheap but where the difficulties and cost of transportation render it impossible to be dispatched to the markets of the great cities for profitable disposal. Moreover, the low cost of production renders it possible for machine-skimmed milk, which is in itself a perfect food and is perhaps purer than the whole milk (in skimming by means of the mechanical apparatus the greatest part of the natural impurities in the raw milk are removed and remain in the separator), to be made available for the masses in the large cities.

If required, the milk powder can be easily reconverted into its original liquid condition by the addition of about nine parts of water to one of the powder. The product of skimmed milk is easily soluble in cold water, in which it is widely divergent from the majority of dried milks, which only with difficulty dissolve in warm or hot water. In this process no foreign substances, to facilitate the conversion of the liquid milk into a stable substance, or preservative are added, and the fact that the skimmed milk and milk with a low percentage of fat are per-

fectly soluble in cold water is solely attributed to the vacuum treatment adopted, and which constitutes one of the most vital features of the Ekenberg process. It is thus possible for any one under varying conditions, such as soldiers and explorers, to obtain supplies of perfectly natural milk so long as they have access to fresh water. The only difference between the restored and the natural milk is a slightly boiled flavor such as is noticeable when the housewife in hot weather pasteurizes her ordinary milk by scalding it. This effect is attributable to the preliminary process of pasteurization and does not arise from the treatment of the milk in its conversion into powder, and it is only perceptible to an experienced palate. The purity of the restored milk is further testified by the slight sediment which is observable after it has been left standing for more than two hours, this sediment consisting of the albumen coagulated during the pasteurizing process. The experiences of later years have demonstrated the fact that such sediment cannot be avoided without the addition of chemicals, and pasteurized and dried milk must yield some such slight sediment. If such a result is not noticeable after two hours' standing, then chemicals must have been added to the milk at some time or another and in such a case the whole constitution of the milk is altered and no cheese can be made from the restored milk. In regard to these sediments it is to be remembered that the natural milk consists of a serum in which the casein and the fat globules are suspended; it is therefore truly remarkable that this milk powder can be dissolved in water and the milk reconstructed with its casein in its natural condition. However, this sediment is not of sufficient importance to prevent the utilization of the milk powder in the various commercial uses for which it is eminently adapted, such as bakery and confectionery operations. With the Ekenberg dried milk powder it was quite practicable to make cheese, which testifies to the fact that the inner construction of the milk is in no way altered by the drying process.

In comparison with the condensed milk which has now such an extensive vogue, the milk powder has a marked advantage. The ordinary condensed milk with sugar contains from 8 to 12 per cent of milk fat, depending on the quality of the brand, whereas the milk powder contains more than double the quantity, or about 25 per cent of milk fat. In the former, again, the percentage of dry milk substance aggregates some 40 per cent, the balance being sugar and water; the powdered milk contains 98.5 per cent of milk substance, the remaining 1.5 per cent being free moisture. One pound of condensed milk will yield 1.6 quarts of restored milk according to the usual direc-

tions for use, while the same quantity of milk powder will give 3.5 quarts. Whereas the condensed milk must be carefully stored in air-tight tins hermetically sealed under special precautions (since any puncture of the vessel will result in leakage and the ultimate fermentation of the contents), with the milk in powder no such apprehensions need be entertained, as a puncture of the tin can result in no serious harm, and it will keep in all climates and retain its sweet and pure qualities under all conditions. Furthermore, while the condensed milk is available only for the sweetening of fluid foods, the powdered variety is applicable in all dry food preparations appealing to domestic use, such as custard powder, cereal preparations, and so forth, as in its raw condition, owing to the milling and grinding operations to which it is subjected, it is of the same consistency and nature as the ordinary wheaten flour, while the absence of added sugar does not sweeten the preparations but gives the same results as if the housewife simply added the preparations desired with ordinary fresh milk.

In regard to the presence of bacteria in the Ekenberg milk powder the various analyses and severe tests to which samples have been subjected show the preparation to be free from such contaminations. Prof. W. Booth, of Syracuse, N. Y., who has made a thorough examination on this subject, found that even after a week's exposure to a temperature of 60 and 65 deg. F. no colonies of bacteria in suitable strata were mixed with the powder. This immunity is probably due to the bacteria-destroying influence of the serum-enzymes of the milk during the concentration in the vacuum, whereby the enzymes are kept in full activity.

Under an arrangement recently made by the Metropolitan Steamship Co. with the Taxi Motor Cab Co. of Boston, the attractive taxi-cabs of that company are now meeting the Harvard and Yale on their arrival every morning in Boston. The vehicles are in great demand, and no wonder, for they are luxurious, attractive, and always in first-class condition, then, too, the taxi-cabs are less expensive than carriages for getting about, particularly between India Wharf and the different railroad stations, steamship or steamboat lines, also the hotels and residences generally throughout the city.

An effort is being made to establish a new steamship line running between New Orleans and Los Angeles, Cal., the Orient and South America, the line to be known as the Mississippi Valley & Orient Steamship Co.

ATLANTIC COAST NOTES.

Office of the MARINE REVIEW,
Room 1005, No. 90 West St.,
New York City.

There is a reasonable prospect that another passenger line may in the near future be added to the New York and Bermuda service. Consul W. Maxwell Greene, at Hamilton, reports that a company, known as the Bermuda Atlantic Steamship Co. has been tentatively formed by an association of business men in Bermuda and the United States. It is intended that a steamer, carrying only saloon passengers, and no freight, will take up the service in the coming season. The passage from New York to Bermuda is to be made in 45 hours, the vessel to accommodate 150 persons.

The British steamship Minnehaha, of the Atlantic Transport line, which arrived at New York on Monday from London, reported having for three days a fire in one of the bunkers. The fire was extinguished after a quantity of the coal in the bunker had been removed. The liner was practically undamaged, and at no time was there any noticeable excitement among the passengers.

The Canadian Government has prohibited, by an order passed in council, fishing by means of steam trawlers within the bays and harbors of Canada, and within the three-mile limit. This action has been taken because of the strong protests made by Nova Scotia fishermen, who contend that trawlers will seriously diminish the supply of fish. A steam trawler from Scotland recently arrived at Canso and commenced operations, this being supposedly the first step toward introducing this system.

The Cunard Liner Lusitania did not manage to make any new records on her recent trip, having encountered dirty weather on the passage. She brought over 1,800 passengers.

And it turns out that the snake fish shot on the coast of Ireland, reported as being 30 ft. in length, 2 ft. in beam and with the head of a seal, was the swollen carcass of a bullock dumped from a passing cattle ship.

The steamship Washtenaw, which for several years was engaged in the Texas oil trade, has cleared New York for San Francisco, there to go into the California oil-carrying trade from Porta Costa to the Isthmus. The Washtenaw is the third steamer trading in the Texas oil trade that has left for the Pacific. She is owned by the Saginaw Steamship Company, and was built in England in 1887.

Two inspectors of customs from the United States will in future be stationed

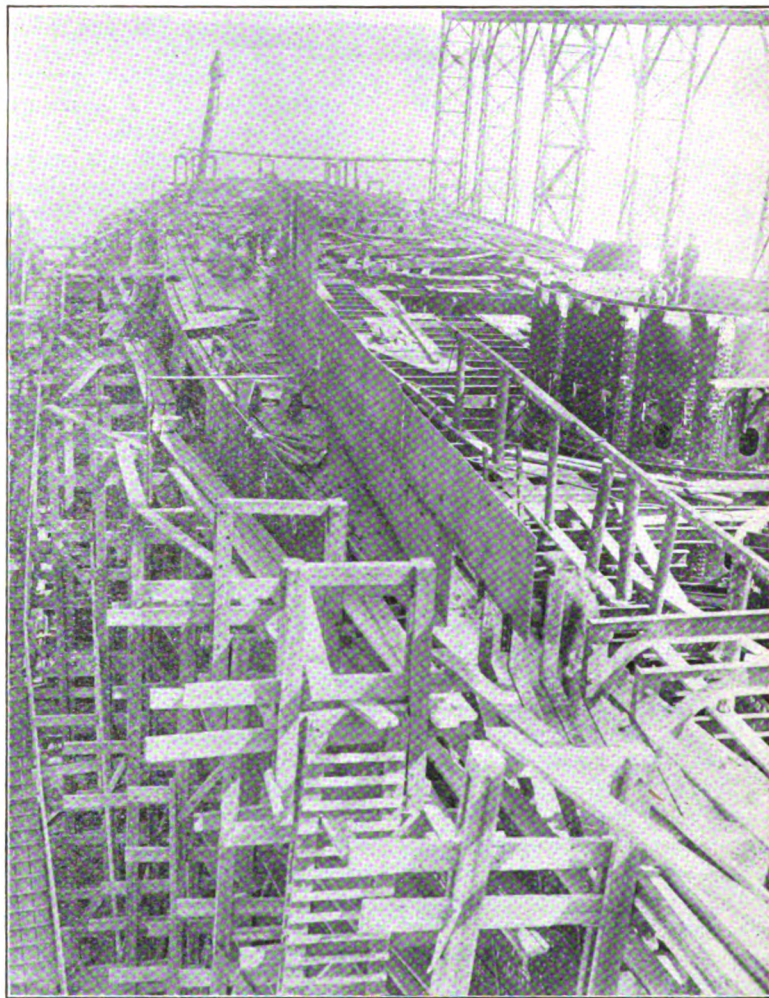
at Havana for the purpose of examining the baggage of passengers bound for this country, if the scheme, which has been favorably reported on by the Treasury Department, is carried out. This inspection will dispense with the examination now carried out at the passengers' destination.

The Galileo, a new steamer built for the Wilson line by the Northumberland Ship Building Co., and engined by the Palmer Ship Building Co., Jarrow-on-Tyne, arrives this week at New York.

without serious damage to the vessel or cargo. The Hughendon was from New York for Pernambuco.

A hurricane which swept over Turk's Island during the latter part of last week caused considerable damage in the neighborhood, and particularly among shipping. The Haitien sloop Telegraph, which had taken shelter at Hawk's Nest, foundered with all hands. Other serious losses are reported.

For the first time in a number of years



SHOWING BATTLESHIP NORTH DAKOTA ON SEPT 1, BUILDING AT FORE RIVER AT WHICH TIME SHE WAS 50.1 PER CENT COMPLETED—A GAIN OF 4.4 PER CENT FOR THE MONTH.

The Galileo is a first class cargo carrying steamer 422 ft. in length, 52 ft. beam and 30 ft. 6 in. depth of hold. She is equipped with every convenience for the quick loading and discharging of cargo and is of 4,766 gross tons. She will go into the Wilson Line service between New York and Hull, England, and is the second Wilson liner of that name.

The British steamship Hughendon, according to cablegrams received from Brazil on Monday, arrived at Rio Grande-do-Sul last Thursday with fire in her cross bunkers. The fire was extinguished

appointments were made this week of five apprentices to the Pennsylvania Pilots by the Commissioners of Navigation, the appointments being made as the result of that body finding that the Pennsylvania pilots were decreasing in number through deaths and resignations and that no apprentices were being assigned to perpetuate the association.

The Russian Volunteer Fleet, started some years ago to participate in the Russian emigration trade between Libau and New York, has been abandoned as a complete failure. The failure of the enter-

prise is said to be due to mismanagement mostly, though passport restrictions and German competition told heavily against the company. According to the published reports describing the conditions prevailing in the Fleet the preference shown to ex-naval men as masters and managers has led to grave abuses in the management of the vessels of the fleet. Captains of fleet steamers received \$4,000 per year, while the corresponding salary of the North German Lloyd is \$1,800. The same difference exists right down the salary list. The boats carried crews of 120 men, compared with the 50 to 85 comprising the crews of corresponding vessels in other lines. It is said that the Danish Line, which ran in competition with the Volunteer Fleet, has placed a bid for all of the Fleet's Atlantic property, and is about to extend its service.

The customs service of the Treasury Department has notified those having business with incoming craft that such vessels must not be boarded until the boarding officers have completed their official work, and that if the vessels are boarded prior to the arrival of the government officers a fine of \$200 will be imposed on the vessel permitting such violation of the law.

TRIALS OF SCOUT CRUISERS.

Standardization trials of the three scout cruisers of the navy—the Salem, the Chester and the Birmingham—will take place on the coast off Rockland, Me., beginning about Oct. 15, preparatory to the long comparative cruises of these vessels for the purpose of acquiring definite and reliable information as to the relative value of the two types of turbines and ordinary reciprocating engines used on these three vessels. The Salem has the American Curtis turbines, the Chester, the British Parsons turbines and the Birmingham, the reciprocating engines. The three "greyhounds of the navy," as the scout cruisers are called, have been ordered into dock at the Boston navy yard to prepare for the tests.

The Chester and the Birmingham are to make several tests over a measured mile to determine various questions of water consumption. These will occupy about two weeks, after which the long cruise of the three vessels together to determine relative efficiency will be undertaken. There are to be two cruises, one of a thousand miles and one of 2,000 miles. The latter will probably be from Boston to Guantanamo and across the Caribbean and back to Guantanamo. The shorter cruise will be through the

Mono Passage to Guantanamo. The three vessels will be required to be within sight of each other during the entire cruise. Boards of officers will be on each vessel to make accurate observations.

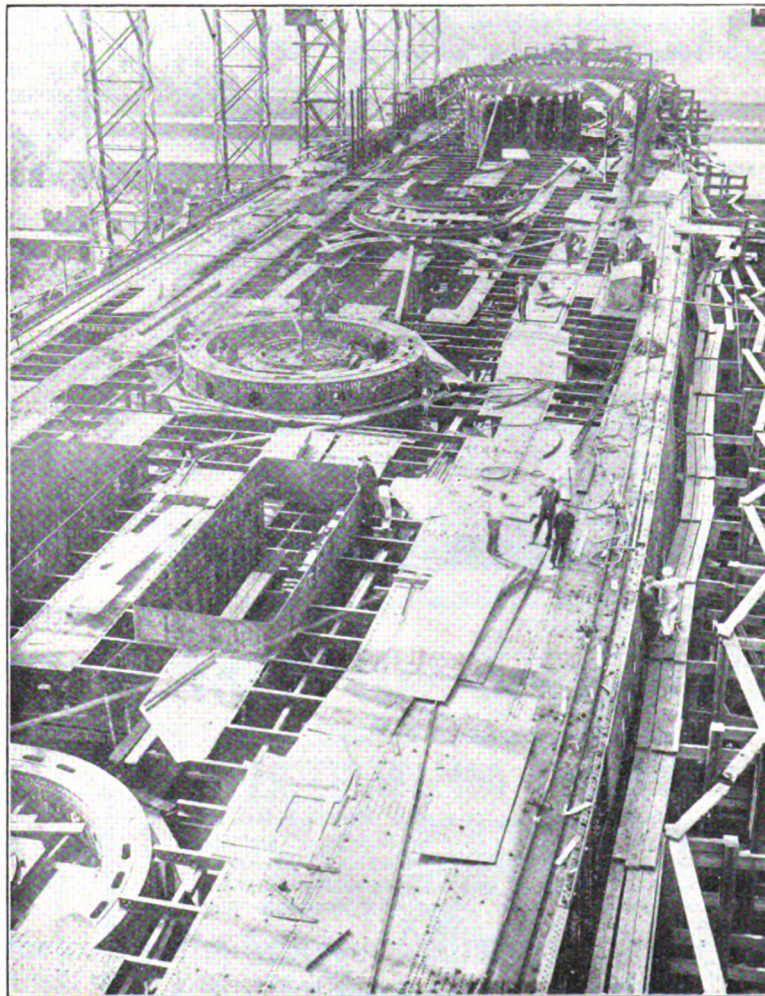
NEW ATLANTIC SQUADRON.

Rear-Admiral Conway H. Arnold is soon to take command of the new Atlantic squadron, which is about to be organized, consisting of three new first-class battleships, two powerful

previously mentioned vessels will constitute what will be known as the Third Squadron of the Atlantic fleet.

Philadelphia is to get first view of the new squadron, as the vessels have been ordered to assemble in that city on Oct. 4 and to stay for the Founders' Week celebration. After this is concluded the squadron will probably proceed to the target grounds off Cape Cod.

The Red Star line steamship



SHOWING BATTLESHIP NORTH DAKOTA ON SEPT 1, BUILDING AT FORE RIVER AT WHICH TIME SHE WAS 50.1 PER CENT COMPLETED—A GAIN OF 4.4 PER CENT FOR THE MONTH.

new armored cruisers and the three fastest scout cruisers afloat. The vessels which will constitute this important command at first are the battleships New Hampshire, Idaho and Mississippi, armored cruisers North Carolina and Montana and scout cruisers Chester, Birmingham and Salem. The dispatch boat Dolphin will be assigned to the squadron also. Later there will be at least five torpedo boat destroyers, four submarines, the auxiliary cruiser Yankee and several auxiliaries, including possibly the new collier Vestal, which together with the

Kroonland, from Antwerp and Dover, was the victor recently over the Holland-American liner Statendam, from Rotterdam, in a race which began in the English channel and ended when the Kroonland passed Sandy Hook 45 minutes in the lead. The liners were never out of sight of each other in the 3,000-mile voyage.

WANTED.

Wanted to buy or charter for 1909, up-to-date excursion steamer for day service, to accommodate about 800 passengers. Speed, 17 miles or over. Must have modern equipment. Address Box 132, MARINE REVIEW.

TWO GIANT LINERS FOR WHITE STAR LINE.

Messrs. Harland & Wolff, Belfast, are making preparations to build two White Star liners, which are to be larger than the Lusitania and Mauretania, but not to be so swift. Their length will be 860 ft., which is 70 ft. longer than the Cunarders. They will have 4 ft. more beam, viz., 92 ft., and they will be about 50,000 tons, as against 33,000 tons for the Lusitania. Their speed will be 19 knots, which is 6 knots less, and it is expected they will be propelled by a combination of turbine and reciprocating engines.

The new slips at the Belfast yard are being got ready and will be finished and building begun before the new year. There are two immense gantries, 225 ft. high, running the whole length of the building slips, each fully 1,000 ft. long. These gantries, supported on 33 huge columns, each over 180 ft. high, will be provided with pneumatic riveters and lifting cranes. It is expected they will be two years in building, and it is rumored that they will be succeeded by vessels of over 1,000 ft.

It is stated that the London and South Western Railway Co. are to construct an immense dry dock at Southampton capable of accommodating the gigantic new steamers.

Robert Wakefield, of San Francisco, has been given the contract for a steel wharf by the city of San Francisco to cost \$302,400.

SPARE PARTS FOR TENDERS.

Bids opened by the lighthouse inspector at Tompkinsville, N. Y., for furnishing spare parts for the tenders Manzanita, Kukui and Lequoia, were as follows:
 Griscom-Spencer Co., New York.....\$250.25
 Colorado Engineering Co., Brooklyn, N. Y. 245.00
 Staten Island Ship Building Co., Port Richmond, N. Y. 255.00

James Shewan & Sons, New York..... 358.00

BIDS FOR CONSTRUCTING WHARF.

Bids opened at the office of the chief of the revenue cutter service, treasury department, Washington, D. C., on Aug. 27, for the construction of a wharf, etc., on Waaddah Island, Neah Bay, Wash., were as follows:
 Barrell Bridge & Construction Co., 75 Star Blvd Bldg., Seattle, Wash.\$21,290
 J. M. Bruce & Co., 500 Pacific Block, Seattle, Wash. 28,000
 International Contract Co., Seattle, Wash. 17,998
 Puget Sound Bridge & Dredging Co., 95 Yesler Way, Seattle, Wash. 25,867

BIDS FOR IMPROVEMENTS AT FORT MASON, CAL.

Bids opened at Fort Mason, San Francisco, Cal., by Major George McK. Williamson, quartermaster, U. S. army, on Aug. 12, for the construction of sea wall, crib wall, transport wharves and sheds for new army supply depot at that point, were as follows:

Plans and specifications prepared by Government. Bidder.
 Pacific Constr. Co., 16 California St., San Francisco, Cal.\$1,447,000 \$1,147,000
 American Constr. Co., 338 Pine St., San Francisco, Cal. 1,428,000
 C. Leonhardt & L. J. Mensch, 42 Market St., San Francisco, Cal. 1,348,000
 San Francisco Bridge Co., 865 Monadnock Bldg., San Francisco, Cal. 1,143,000 { 1,286,000
 Penn Bridge Co., Beaver Falls, Pa. 1,040,000 { 1,440,000

BIDS FOR REPAIRING TENDER.

Bids opened by the inspector of the fourth lighthouse district, Philadelphia, Pa., Aug. 13, for making repairs to the lighthouse tender Sunflower, were as follows:
 Kensington Ship Yard Co., Philadelphia, Pa.\$ 947
 Harlan & Hollingsworth Corp., Wilmington, Del. 1,412

BIDS FOR REPAIRING LIGHT VESSEL.

Bids for making repairs to light vessel No. 52 were opened Aug. 13 by the inspector of the fourth lighthouse district, Philadelphia, Pa. They were as follows:
 *Pusey & Jones Co., Wilmington, Del.\$1,339
 Harlan & Hollingsworth Corp., Wilmington, Del. 1,464
 Kensington Ship Yard Co., Philadelphia, Pa. 1,695

*Accepted.

IMPROVING PAMLICO SOUND.

Bids were opened at the United States engineer office, Wilmington, N. C., on July 27,

1908, for constructing and improving inland waterway, Pamlico Sound to Beaufort Inlet, N. C. The bids received were as follows:
 P. Sanford Ross, Inc., Jersey City, N. J., division A, 1,800,000 cu. yds., 13.6 cents per cubic yard; amount \$244,800.

Maryland Dredging & Contracting Co., Baltimore, Md., 1034 cents per cubic yard, amount \$387,000; bid on the whole.

Atlantic Dredging Co., Philadelphia, Pa., 1314 cents for division A, 21 cents for division B, amount \$621,000 for both sections.

Coastwise Dredging Co., Norfolk, Va., 1974 cents for division B; amount \$357,750 on section B.

Sanford & Brooks Co., Baltimore, Md., 18 cents for division A, 23 cents for division B, amount \$738,000 for both sections.

John Anderson, Gulfport, Miss., 1134 cents for the whole, amount \$423,000 for the whole.

Roderick G. Ross, Jacksonville, Fla., 9.9 cents for division A, amount \$178,200 for division A only.

Atlantic, Gulf & Pacific Co., New York, N. Y., 914 cents for division A, amount \$171,000 for division A only.

North American Dredging Co., New York, N. Y., for division A, 1034 cents, amount \$193,500; 14.48 cents for division B, amount \$260,640; for the whole 11.74 cents, amount \$422,640.

The act of congress of 1907, provided for "Improving and Constructing Inland Waterway, from Pamlico Sound to Beaufort Inlet, N. C." and appropriated the sum of \$550,000 on the continuing contract system. This provides for what is known as the third division of the inland waterway from Norfolk, Va., to Beaufort Inlet, N. C. This division covers a distance of about 50 miles. On this distance a minimum depth of 10 ft. is to be secured by dredging Adams and Core creeks and by digging a canal to connect the heads of these creeks.

The length of the division 3 upon which actual improvement will be required is about 14 miles. About five miles of this will be through dry land. The topography is such that the route has been divided in two divisions, A and B, each division requiring the excavation of about 1,800,000 cu. yds. of material.

Section B covers the part of the route through dry land, and is considered to be considerable of an undertaking; division B is through the creek portions, and offers only the usual dredging proposition of soft mud, sand, etc.

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The Maryland Dredging & Contracting Co., of Baltimore, Md., the lowest bidders, included in their bid the entire work. This firm is fully capable of carrying out the proposition, and should the award be made to them, which is quite likely, their financial standing entitling them to all consideration, it is assumed that the work will progress satisfactorily to the United States.

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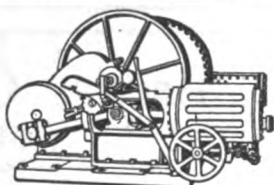
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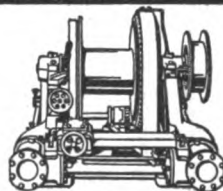
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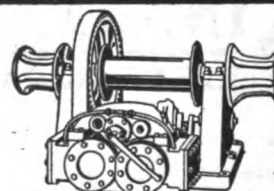
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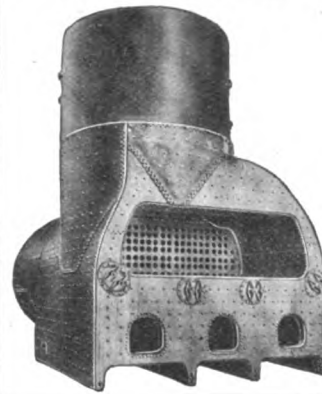
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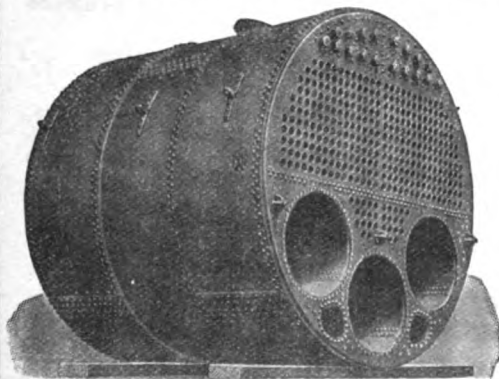
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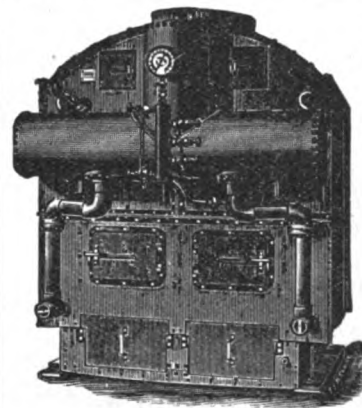
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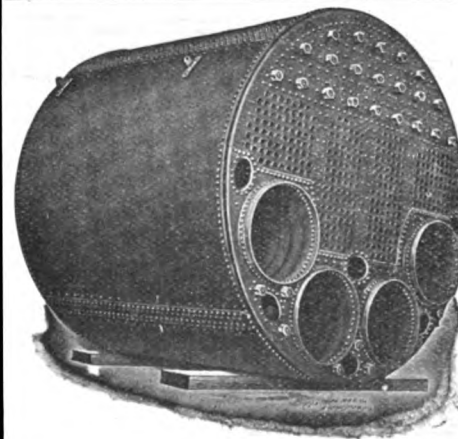
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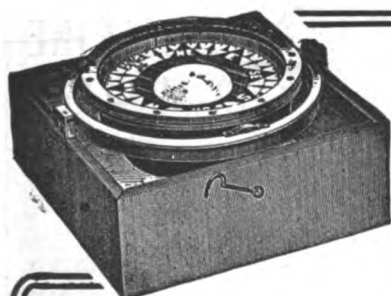
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 Milwaukee Dry Dock Co., Milwaukee, Wis.
 New York Ship Building Co., Camden, N. J.
 Quintard Iron Works Co., New York, N. Y.
 Roberts Safety Water Tube Boiler Co.,
 New York, N. Y.
 Superior Ship Building Co., Superior, Wis.
 Toledo Ship Building Co., Toledo, O.

BRASS GOODS.

Michigan Lubricator Co., Detroit, Mich.
 Penberthy Injector Co., Detroit, Mich.

BRIDGES.

Scherzer Rolling Lift Bridge Co., Chicago, Ill.

BRONZE.

American Manganese Bronze Co.,
 New York, N. Y.

BRONZE (Manganese).

American Manganese Bronze Co.,
 New York, N. Y.

BUCKETS (Ore and Coal).

Brown Hoisting Machinery Co., Cleveland, O.
 Hayward Co., The, New York, N. Y.
 Huntsberry, H. E., Cleveland, O.

BUOYS, BOATS, PRESERVERS, ETC. (Life).

Armstrong Cork Co., Pittsburg, Pa.
 Drein & Son, Thos., Wilmington, Del.
 Kahnweiler's Sons, David, New York, N. Y.
 Lundin, A. P., New York, N. Y.
 National Cork Co., Brooklyn, N. Y.

BUOYS (Gas).

Safety Car Heating & Lighting Co.,
 New York, N. Y.

CANVAS.

Baker & Co., H. H., Buffalo, N. Y.
 Upson-Walton Co., Cleveland, O.

CAPSTANS.

American Ship Windlass Co., Providence, R. I.
 Chase Machine Co., Cleveland, O.
 Dake Engine Co., Grand Haven, Mich.
 Hyde Windlass Co., Bath, Me.
 Marine Iron Works, Chicago, Ill.

CAPSTANS (Steam).

Chase Machine Co., Cleveland, O.

CASTINGS (Brass and Bronze).

American Manganese Bronze Co.,
 New York, N. Y.
 Griscom-Spencer Co., New York, N. Y.
 Cramp, Wm., & Sons, Philadelphia, Pa.
 Fore River Ship Building Co., Quincy, Mass.
 Great Lakes Engineering Works, Detroit, Mich.

CASTINGS (Steel).

Otis Steel Co., Cleveland, O.

CEMENT.

(Iron for Repairing Leaks.)

Smooth-On Mfg. Co., Jersey City, N. J.

CHAINS.

Seneca Chain Co., Kent, O.

CHANDLERS (Ship).

Baker, Howard H., & Co., Buffalo, N. Y.
 Great Lakes Supply Co.,
 Buffalo, N. Y., and Duluth, Minn.
 Griscom-Spencer Co., New York, N. Y.
 Upson-Walton Co., Cleveland, O.

CHARTS.

Penton Publishing Co., Cleveland, O.

CIRCULATORS (Automatic).

Copeland Co., E. T., New York, N. Y.

CLOCKS AND CHRONOMETERS (Marine).

Ritchie, E. S., & Sons, Brookline, Mass.

CLOTH (Waterproof).

Bunker, E. A., New York, N. Y.

COAL (Producers and Shippers).

Hanna, M. A., & Co., Cleveland, O.
 Lorain Coal & Dock Co., Cleveland, O.
 Pickands, Mather & Co., Cleveland, O.
 Pittsburg Coal Co., Cleveland, O.
 Toledo Fuel Co., Toledo, O.

COMPASSES.

Ritchie, E. S., & Son, Brookline, Mass.

COMPOUND (Boiler).

Bird-Archer Co., New York, N. Y.

COMPOUNDS (Lubricating).

Cook's Sons, Adam, New York, N. Y.

CONDENSERS.

Great Lakes Engineering Works, Detroit, Mich.

CONTRACTORS (Dredging).

Breyman & Bros., G. H., Toledo, O.
 Buffalo Dredging Co., Buffalo, N. Y.
 Dunbar & Sullivan Dredging Co., Buffalo, N. Y.
 Great Lakes Dredge & Dock Co., Chicago, Ill.
 Northern Dredge Co., Duluth, Minn.
 Starke Dredge & Dock Co., C. H.,
 Milwaukee, Wis.

Sullivan, M., Buffalo, N. Y.

CONTRACTORS.

(Pile Driving and Submarine.)

Buffalo Dredging Co., Buffalo, N. Y.
 Dunbar & Sullivan Dredging Co., Buffalo, N. Y.
 Great Lakes Dredge & Dock Co., Chicago, Ill.
 Parker Bros. Co., Ltd., Detroit, Mich.
 Starke Dredge & Dock Co., C. H.,
 Milwaukee, Wis.

Sullivan, M., Buffalo, N. Y.

CONTRACTORS (Public Work).

Breyman & Bros., G. H., Toledo, O.
 Buffalo Dredging Co., Buffalo, N. Y.
 Dunbar & Sullivan Dredging Co., Buffalo, N. Y.
 Griscom-Spencer Co., New York, N. Y.
 Great Lakes Dredge & Dock Co., Chicago, Ill.
 Starke Dredge & Dock Co., C. H.,
 Milwaukee, Wis.

Sullivan, M., Buffalo, N. Y.